United Nations A/64/66/Add.2*

General Assembly

Distr.: General
19 October 2009

Original: English

Sixty-fourth session
Agenda item 76
Oceans and the law of the sea

Oceans and the law of the sea

Report of the Secretary-General

Addendum

Summary

The present addendum has been prepared in response to a request by the General Assembly, in paragraph 128 of its resolution 63/111 of 5 December 2008, for the Secretary-General to submit a report to the Assembly at its sixty-fourth session to assist the Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction in preparing, in consultation with all relevant international bodies, the agenda of its third meeting, to be convened in 2010. The report contains information on activities undertaken by relevant organizations since the last report of the Secretary-General on the matter (A/62/66/Add.2), including those relating to its scientific, technical, economic, legal, environmental and socio-economic aspects. It also provides information on possible options and approaches to promote international cooperation and coordination, and identifies key issues and questions whose consideration by States would benefit from more detailed background studies.

* Reissued for technical reasons.

09-43624* (E) 231109

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Abbreviations

ADB	Asian Development Bank
APFIC	Asia-Pacific Fishery Commission
ECO	Economic Cooperation Organization
EEA	European Environment Agency
FAO	Food and Agriculture Organization of the United Nations
FFA	Forum Fisheries Agency (Pacific Islands Forum)
GEF	Global Environment Facility
GIS	Geographic Information System
ICCAT	International Commission for the Conservation of Atlantic Tunas
IHB	International Hydrographic Bureau
IHO	International Hydrographic Organization
IMO	International Maritime Organization
IOC	Intergovernmental Oceanographic Commission of UNESCO
ISA	International Seabed Authority
IUCN	International Union for Conservation of Nature
IWC	International Whaling Commission
London Convention	Convention on the Prevention of Marine Pollution by Dumping of Wastes and other matter 1972
London Protocol	Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972
MARPOL	International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto
NEAFC	North-East Atlantic Fisheries Commission
NPAFC	North Pacific Anadromous Fish Commission
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNEP-WCMC	UNEP World Conservation Monitoring Centre
UNESCO	United Nations Educational, Scientific and Cultural Organization

UN-Oceans	Inter-agency coordination mechanism on ocean and coastal issues within the United Nations system
UNU-IAS	United Nations University Institute of Advanced Studies
WIPO	World Intellectual Property Organization

I. Introduction

1. The oceans are characterized by a high diversity of physical features and life, ranging from shallow, near-shore ecosystems and species to the deepest and most remote features on Earth such as trenches and abyssal plains. Marine biological diversity (hereinafter "biodiversity"), which includes diversity within marine species, between species and of ecosystems,[1] is still largely unexplored but is believed to be extremely rich and to include a large portion of the planet's living organisms, both within and beyond areas of national jurisdiction. While micro-organisms are the most genetically diverse marine organisms and dominate the oceans' biomass, marine macro-organism diversity is also high. The greatest — and most accessible — marine biodiversity is in coastal areas, but marine life is continuously being discovered in areas previously thought to be too inhospitable for life to thrive, such as in the deep polar waters and around hydrothermal vents.[2] It is estimated that over 1,000 new species are discovered annually.[3] Marine habitats and ecosystems are also extremely diverse, ranging from pelagic to benthic ecosystems, such as hydrothermal vents and abyssal plains.

2. A number of factors have spurred an increase in human activities further away from coastal areas, including declines and, in some cases, collapse of shallow water fish stocks, the development of the required technology to explore and exploit seabed mineral resources, the search for new alternative sources of energy, and more stringent regulation of certain activities in areas within national jurisdiction. Growing scientific and commercial interest in areas heretofore largely unexplored are cumulatively affecting marine biodiversity and biological resources, which include genetic resources. Concerns about the health and resilience of marine ecosystems and associated biodiversity to withstand increasing pressure are being raised, including most recently in the *Millennium Development Goals Report 2008*,[4] in particular in light of the proximity of the target years of 2010, 2012 and 2015 set by the World Summit on Sustainable Development for a number of actions related to sustainable development of the oceans.[5]

3. While the greatest intensity of human activities and pressures on marine biodiversity continue to be in coastal areas, increasing attention is being paid to the vulnerability of marine biodiversity beyond areas of national jurisdiction, to the ecosystem services that it provides and to its potential role in economic and socio-economic development, among others.

4. Various efforts have been initiated at the international level to address the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction.[6] In particular, by paragraph 73 of its resolution 59/24 of 17 November

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[1] Definitions of "biological diversity", "biological resources", "ecosystems" and "genetic resources" are found in article 2 of the Convention on Biological Diversity. See also A/60/63/Add.1, paras. 4-8.

[2] See Census of Marine Life at http://www.coml.org/.

[3] Agence française des aires marines protégées, *Cross-checking High Seas Issues — Towards an Ecosystem-based Management Approach* (2009).

[4] The report notes that despite their importance to the sustainability of fish stocks and coastal livelihoods, only 0.7 per cent of the world's oceans — about 2 million square kilometres — are currently protected. See www.un.org/millenniumgoals.

[5] See, in particular, paras. 30(d), 31(a), and 32(c) of the Johannesburg Plan of Implementation.

[6] For additional information, see section II below as well as A/60/63/Add.1, paras. 226-304 and A/62/66/Add.2.

2004, the General Assembly established the Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction. At its first meeting, in February 2006, the Working Group had the mandate to (a) survey the past and present activities of the United Nations and other relevant international organizations with regard to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction; (b) examine the scientific, technical, economic, legal, environmental, socio-economic and other aspects of these issues; (c) identify key issues and questions where more detailed background studies would facilitate consideration by States of these issues; and (d) indicate, where appropriate, possible options and approaches to promote international cooperation and coordination for the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction. The Working Group was assisted in its consideration of these issues by a report prepared by the Secretary-General pursuant to paragraph 74 of General Assembly resolution 59/24.[7]

5. Delegations at the 2006 meeting of the Working Group reaffirmed that the United Nations Convention on the Law of the Sea provided the legal framework for all activities in the oceans and seas and that any action relating to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction should be consistent with its legal framework. In addition, it was recognized that the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction needed to be approached in an integrated manner, on the basis of precautionary and ecosystem approaches to ocean management. The Working Group provided a unique opportunity to facilitate work in this area, in a comprehensive manner.[8]

6. In 2006, in paragraph 91 of its resolution 61/222, the General Assembly decided to convene, in accordance with paragraph 73 of resolution 59/24, another meeting of the Working Group in 2008 to consider (a) the environmental impacts of anthropogenic activities on marine biological diversity beyond areas of national jurisdiction; (b) coordination and cooperation among States as well as relevant intergovernmental organizations and bodies for the conservation and management of marine biological diversity beyond areas of national jurisdiction; (c) the role of area-based management tools; (d) genetic resources beyond areas of national jurisdiction; and (e) whether there was a governance or regulatory gap, and if so, how it should be addressed. In its deliberations, the Working Group was assisted by a report of the Secretary-General prepared pursuant to the same resolution.[9]

7. The outcome of the 2008 meeting consisted of a joint statement of the Co-Chairpersons,[10] which provided a summary of key issues, ideas and proposals, as well as some concluding remarks by the Co-Chairpersons based on their assessment of the discussions. The latter noted the need for ongoing consideration by the General Assembly of the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction, in particular within the framework of the Working Group.

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[7] A/60/63/Add.1.

[8] See A/61/56, para. 5 and annex I, paras. 3 and 5.

[9] A/62/66/Add.2.

[10] A/63/79, annex.

8. Furthermore, in 2008, in paragraph 127 of its resolution 63/111, the General Assembly requested the Secretary-General to convene, in accordance with paragraph 73 of resolution 59/24 and paragraphs 79 and 80 of resolution 60/30, a meeting of the Working Group in 2010 to provide recommendations to the Assembly. It also requested the Secretary-General to submit a report to the Assembly at its sixty-fourth session to assist the Working Group in preparing its agenda in consultation with all relevant international bodies.

9. The present report has been prepared in response to that request. Sections II, III and IV of the report address respectively (a) recent activities of relevant organizations, including their work on scientific, technical, economic, legal, environmental and socio-economic aspects of the topic; (b) possible options and approaches to promote international cooperation and coordination; and (c) key issues and questions whose consideration by States would benefit from more detailed background studies. The report includes information provided by the relevant international bodies at the request of the Secretariat. Notably, the following organizations and entities submitted information reflected in the report: ADB, APFIC, the secretariats of the Convention on Biological Diversity and the Convention on the Conservation of Migratory Species of Wild Animals, ECO, EEA, FAO, FFA, IOC, ICCAT, IHB, IHO, IMO, IUCN, IWC, NEAFC, NPAFC, the Commission for the Protection of the Marine Environment of the North-East Atlantic, UNU-IAS and the World Bank. UNEP and the Department of Economic and Social Affairs of the Secretariat also contributed to the report.

10. The present addendum should be read in conjunction with previous reports of the Secretary-General on oceans and the law of the sea (in particular, A/60/63/Add.1, A/61/63 and Add.1, A/62/66 and Add.1, A/63/63 and Add.1 and A/64/66), the reports of the Secretary-General on sustainable fisheries (in particular, A/61/154, A/62/260 and A/64/305), the reports on the meetings of the Working Group (A/61/65 and A/63/79) and the reports of meetings of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea during which issues relevant to the conservation and sustainable use of marine biodiversity, including in areas beyond national jurisdiction, were discussed.[11]

II. Recent activities of relevant organizations

11. The information contained in the present section is based primarily on contributions received from relevant international bodies, supplemented by other sources readily available in the public domain. However, in view of the limited information available on key aspects, such as the economic and socio-economic, this report cannot be perceived as providing an exhaustive survey of recent developments. Also, in the presentation of the information, while care has been

[11] "Responsible fisheries and illegal, unregulated and unreported fisheries" and "Economic and social impacts of marine pollution and degradation, especially in coastal areas" (A/56/121), "Protection and preservation of the marine environment" (A/57/80), "Protection of vulnerable marine ecosystems" (A/58/95), "New sustainable uses of the oceans, including the conservation and management of the biological diversity of the seabed in areas beyond national jurisdiction" (A/59/122), "Fisheries and their contribution to sustainable development and marine debris" (A/60/99), "Marine genetic resources" (A/62/169), and "Ecosystem approaches and oceans" (A/61/156).

taken, to the extent feasible, to use the terminology of the law of the sea, it should be noted that the terms "open ocean" and "deep sea" are being increasingly used by scientists and policymakers.[12]

A. Marine science and technology

12. The 2008 meeting of the Working Group emphasized the essential role of science in underpinning further efforts in the conservation and sustainable use of marine biological diversity. Broad support was expressed for additional scientific research to continue improving knowledge of ocean ecosystems and their biodiversity, particularly in certain areas, such as the deep sea, that are still largely unexplored. Moreover, it was recognized that building sound and objective scientific advice was essential and in that regard, a regular assessment of the state of the marine environment on a global scale, to support decision-making and adaptive management, was considered desirable (see also paras. 22, 23, 190 and 206 below).[13]

13. The importance of promoting scientific research on marine genetic resources was also recognized (see paras. 103-106, 193 and 199 below).[14] In particular, limited knowledge of the adaptation process of deep-sea organisms continues to raise questions as to the mechanisms they use to adapt to their environment and possible commercial applications.

14. Some examples of recent activities in the area of marine science and technology are discussed below.

1. Marine science

15. Marine science plays a fundamental role in the conservation and sustainable use of marine biodiversity. However, knowledge about marine biodiversity, particularly beyond areas of national jurisdiction, remains scarce. While there is an increasing demand for scientific knowledge, it has been reported that marine biodiversity is the subject of many fewer research and protection efforts than those carried out for the terrestrial environment.[15] As a result, there is limited understanding of ocean ecosystems beyond areas of national jurisdiction, in particular deep-sea ecosystems, and about the vulnerability, resilience and functioning of the associated marine biodiversity. Sustained marine scientific

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[12] For example, a UNESCO-IOC report on biogeographic classification states: "Open ocean and deep seabed are non-legal term commonly understood by scientists to refer to the water column beyond the continental shelf. Open ocean and deep seabed habitats may occur in areas within national jurisdiction in States with a narrow continental shelf, or where the continental shelf is intersected by underwater canyons." See UNESCO-IOC, *Global Open Oceans and Deep Seabed (GOODS) — Biogeographic Classification*, IOC Technical Series No. 84 (2009). The term "deep sea" is defined by UNEP, in a recent publication, as waters and sea-floor areas below 200 metres, where sunlight penetration is too low to support photosynthetic production. See UNEP, *Deep-Sea Biodiversity and Ecosystems: A scoping report on their socio-economy, management and governance* (2007). See also annex I to decision IX/20 of the Conference of the Parties to the Convention on Biological Diversity.

[13] A/63/79, paras. 10 and 19.

[14] Ibid., para. 33.

[15] See note 3 above.

research activities are thus essential in order to understand marine ecosystems and assess the potential impacts of activities and uses on marine biodiversity.[16]

16. Undoubtedly, recent scientific works continue to expand and improve our knowledge. For example, initiatives such as the Census of Marine Life aim at assessing and explaining the diversity, distribution and abundance of life in the oceans. The first comprehensive census will be released in 2010 (see also A/62/66/Add.2, para. 111).[17] Relevant projects of the Census include the Ocean Biogeographic Information System (OBIS), which focuses on data; the Chemosynthethic Ecosystem Science project (ChEss), focusing on hydrothermal vents and cold seeps; the Global Census of Marine Life on Seamounts (CenSeam); the Mid-Atlantic Ridge Ecosystem project (MAR-ECO); and the Census of the Diversity of Abyssal Marine Life (CeDAMar).

17. In 2006, ISA established the Endowment Fund, a programme for collaborative marine scientific research which seeks to support the participation of qualified scientists and technical personnel from developing States in marine research activities in the Area[18] and to provide opportunities for collaboration. The Fund became fully operational in 2008 and in January 2009 applications were being received for science fellowships.[19]

18. From 2002 to 2007, ISA participated in the Kaplan project to analyse biodiversity, species ranges and gene flow in nodule areas of the seabed. Since 2008, ISA has been a partner in the Global Census of Marine Life on Seamounts,[20] which assesses the biodiversity patterns of seamounts in order to identify knowledge gaps. In addition, the secretariat of ISA carries out detailed resource assessments of the areas reserved for the Authority; maintains a specialized database of information on the resources of the Area and monitors the current status of scientific knowledge of the marine environment as part of its ongoing development and formulation of the Central Data Repository.

19. To further scientific knowledge on areas beyond national jurisdiction, FAO, through one of its projects, is collaborating with other partners in the conduct of a pelagic survey on the seamounts in the Southwest Indian Ocean Ridge.[21]

20. Other research efforts include the European Commission-funded deep-sea science research projects Hermes and Hermione (see paras. 34, 106 and 190 below). Hermes, an interdisciplinary research programme, was designed to gain new insights into the biodiversity, structure, function and dynamics of marine ecosystems along Europe's deep-ocean margin to support the development of sustainable management strategies based on scientific knowledge.[22] Study sites extended from the Arctic to the Black Sea and included biodiversity hotspots, such as coldwater coral reefs and carbonate mounds, cold seeps, canyons and anoxic environments. Hermes will be followed up by Hermione, which places special emphasis on research into the

[16] A/60/63/Add.1, para. 174.

[17] See http://www.coml.org/.

[18] The United Nations Convention on the Law of the Sea defines the Area as the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction (article 1).

[19] See http://www.isa.org.jm.

[20] See http://censeam.niwa.co.nz/.

[21] Contribution of FAO. The partners include IUCN and the Aghulas and Somali Currents Project. See note 236 below.

[22] See http://www.eu-hermes.net.

impact of fishing, litter and pollution on the deep-sea environment; the socio-economic aspects of conservation; and how the scientific community can best work with policymakers. New research will also be undertaken on hydrothermal vents, oceanic islands and seamounts.[23]

21. While the work carried out under Hermes and Hermione is mostly within areas of national jurisdiction, lessons learned of relevance for areas beyond national jurisdiction include the importance of biodiversity to ecosystem function (a loss of 20 to 30 per cent in deep-sea biodiversity can result in a 50 to 80 per cent reduction of deep-sea ecosystems' key processes); the extent of adverse effects of fisheries below the depth of actual fishing effort; the relative footprint of fisheries compared to other human activities; the interconnections between deep seas and margins, particularly the importance of submarine canyons; and the paucity of deep-sea biodiversity data and the need for open access metadata sets and data sharing.[24]

22. Scientific knowledge is essential for sound decision-making.[25] In this regard, the decision by the General Assembly to establish, under the United Nations, the regular process for global reporting and assessment of the state of the marine environment[26] should be recalled. The regular process will provide information to decision makers on the causes of environmental degradation and its consequences for human beings through assessments that will also include socio-economic aspects. These assessments will improve the scientific understanding and assessment of marine and coastal ecosystems as a fundamental basis for sound decision-making. The results of the start-up phase of the regular process, the "assessment of assessments", highlight that integrated assessments will likely motivate substantial data collection efforts by Governments, intergovernmental and non-governmental organizations and industry to improve the data basis of future assessments. [27] At the same time, there is a need for capacity-building (see para. 206 below).

23. In its report on the "assessment of assessments",[28] the Group of Experts established pursuant to General Assembly resolution 60/30 included summaries on global or supra-regional themes, such as marine biodiversity, global open oceans and deep seabed biogeographic classification.[29] These summaries, inter alia, provide an inventory of organizations involved in assessments and other scientific reviews as well as indications of the main threats and priority issues relating to marine biodiversity, including in open ocean and seabed areas. In the summary on marine biodiversity, reference is made to a 2006 article on a synthesis of scientific knowledge on global trends in marine biodiversity where it is stated that marine biodiversity has naturally exhibited slow increases with clear mass extinction events. The expected consequences of the adverse impacts of anthropogenic activities (see paras. 44-101 below) are changes to ecosystem function and services. These global trends indicate growing biodiversity losses, which are likely to

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[23] UNEP, "The Hermes story: shedding light into the deep sea", April 2009, at www.unep-wcmc.org/oneocean/pdf/TheHERMESstory.pdf and www.eu-hermes.net/publications_public.html.

[24] Contribution of the Commission for the Protection of the Marine Environment of the North-East Atlantic.

[25] See A/56/58, para. 9.

[26] General Assembly resolution 57/141, para. 45.

[27] See A/64/88.

[28] "An Assessment of Assessments", available at http://www.unga-regular-process.org.

[29] Ibid., annex V.

accelerate in the future with unpredictable consequences.[30] The report on the results of the "assessment of assessments" was examined by the Ad Hoc Working Group of the Whole established pursuant to General Assembly resolution 63/111 at a meeting held in New York from 31 August to 4 September 2009.

24. EEA indicated that it has been working to support marine assessments important to the implementation of the European Union Marine Strategy Framework Directive, which transposes the ecosystem-based approach to the management of human activities into European Union legislation. It has also supported certain preparatory actions and pilot projects relating to the implementation of the Integrated Maritime Policy for the European Union (for example, the European Union project on seabed mapping, European Marine Observation and Data Network).[31]

2. Marine technology

25. Research and, in particular, access to the deep sea to explore marine life are dependent on technological capabilities and infrastructure, for example, vessels for transportation to the study area and equipment and tools for observations, the collection, identification and cataloguing of organisms, the measurement of physical properties, the study of movements and the compilation and analysis of data.[32] In addition, research requires highly trained personnel and adequate financial resources.[33] It is estimated, for example, that the daily use of a research vessel, which remains an essential tool for such research despite the development of new technologies, costs between $15,000 and $25,000 per day at sea.[34] In many instances, the cost of conducting marine scientific research, particularly beyond areas of national jurisdiction, limits the involvement of developing States' scientists and other personnel. The lack of technology and expertise in a field which remains on the cutting edge of science also contributes to fewer researchers from developing countries being involved in deep-sea research initiatives.[35]

26. Technological advances and the changing economies of extraction have allowed, and driven, the exploration and exploitation of deeper and more distant environments. For example, deep-sea fishing and hydrocarbon extraction are routinely done in water depths of more than 1,500 and 2,000 metres, respectively.[36] Concerns associated with global climate change have led to the development of technological and geo-engineering methods (see paras. 87-91 and 98-101 below).

27. At the 2008 meeting of the Working Group, many delegations highlighted the need for technology and its transfer (see also paras. 172-182 and 204-211 below).

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[30] E. Sala and N. Knowlton, "Global marine biodiversity trends", *Annual Review of Environment and Resources*, vol. 31, 2006.

[31] Contribution of EEA.

[32] For details on means used for investigating marine life, see www.coml.org/edu/tech/t1.htm.

[33] A/60/63/Add.1, para. 58.

[34] F. H. Th. Wegelein, *Marine Scientific Research: The operation and Status of Research Vessels and Other Platforms in International Law*, Martinus Nijhoff Publishers, 2005.

[35] M. Lodge, "Collaborative marine scientific research on the international seabed", *Journal of Ocean Technology*, 2008.

[36] V. Gunn and L. Thomsen, "The next generation: providing inspiration and training for future marine scientists", *Oceanography*, vol. 22 (1), 2009.

28. Previous reports of the Secretary-General have provided specific information on the technological issues relating to marine biodiversity.[37] Certain recent developments are outlined below.

29. Sixty Argo floats have been instrumented with oxygen sensors. Argo is a global array of 3,000 free-drifting profiling floats that allow continuous monitoring of the temperature, salinity and velocity of the upper 2,000 metres of the ocean. This programme contributes to a global description of the seasonal cycle and inter-annual variability of the upper ocean thermohaline circulation. The Argo programme has become the pillar of the ocean climate warning system, with consequent benefits for the protection of life and property and effective planning to adapt to the effects of seasonal and inter-annual climate variability. All Argo data are available in near-real-time, and the state of the oceans, including beyond areas of national jurisdiction, is examined by Argo on a regular basis. The addition of oxygen to the currently measured temperature and salinity profiles on Argo will mark a revolutionary advance in the ability to observe the ocean's evolution over time, integrating biogeochemical and physical observations.[38]

30. Technology as it relates to marine biodiversity is wide-ranging and includes analytical technologies that help to visualize, process, add value to data and access collected.[39]

31. Research methods, such as taxonomic identification and the use of model organisms, are increasingly combined with new research methods such as metagenomics and biodiversity informatics. These methods, based on the identification of genes present in a given environmental sample, allow the conduct of biodiversity studies at the community/ecosystem level. It is thought that new approaches, such as genomics and proteomics, will contribute to a further understanding of the deep and open ocean areas.[40]

32. *Geographical Information System*. In recent years, dynamic web-based delivery of data and information through GIS has expanded as a result of increased bandwidth allowing more information to be made available, and as a result of an increased level of permeation of spatial technologies in society through global positioning system and Google Earth-type technologies. GIS is now being used as an additional tool to support decision-making processes. It may be recalled that in a previous report, the Secretary-General drew attention to the problems of using information on maritime limits which may not emanate from an authoritative source.[41]

33. The interactive map of high seas marine protected areas and key habitat distribution is a web-based GIS, developed through collaboration between the

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[37] See, in particular, A/60/63/Add.1, paras. 58-75, 77-82 and 91; A/62/66/Add.2, paras. 206-208. See also A/63/63, para. 239 and A/63/63/Add.1, para. 117, which describe technologies which may be used to access and research biodiversity beyond areas of national jurisdiction. A/63/63, para. 242 and A/63/63/Add.1, paras. 120 and 121 describe technologies to mitigate the impacts of anthropogenic activities on marine biodiversity beyond areas of national jurisdiction.

[38] See "Argo oxygen program — white paper" at www.ioccg.org/groups/argo.html.

[39] For other databases and other repositories related to marine genetic resources, see A/62/66, paras. 138-144. See also para. 106 of the present report.

[40] IOC, *Global Open Oceans and Deep Seabed (GOODS) — Biogeographic Classification*, IOC Technical Series No. 84, 2009.

[41] A/63/63/Add.1, paras. 22-28.

secretariat of the Convention on Biological Diversity and UNEP-WCMC.[42] The map highlights up-to-date information on protective measures for the high seas, including critical habitats and species. A second iteration is planned, which will incorporate information on ecosystem functions, connectivity, threats and habitats, and will facilitate linkages with information on vulnerable marine ecosystems mapped by FAO.

34. A GIS component was recently added to the Hermes project (see paras. 20, 106 and 190 of the present report). Hermes-GIS is a web-based software-independent GIS and provides an interactive querying and visualization tool with access to data collected as part of the project, data archives and metadata.[43] The GIS is made available for general use[44] with partners of the project having password-protected access to unpublished or proprietary data.[45]

35. UNU-IAS is in the process of preparing GIS maps of the regulatory and spatial coverage of regional instruments, which will also highlight both gaps and overlaps of such instruments. The final version of the maps is expected by the end of 2009.

36. *Databases*. Databases are another information tool for providing access to raw data and information. An increasing number of institutions host databases. For example, the Subsidiary Body on Scientific, Technical and Technological Advice of the Convention on Biological Diversity reviewed, at its meeting in 2008, spatial databases and research initiatives regarding areas beyond national jurisdiction, and geographic information systems.[46]

37. UNU-IAS in collaboration with UNESCO has developed a Marine Biological Prospecting Information Resource.[47] The Resource includes a database of information on research and commercialized products arising from biological samples that are sourced from the world's oceans (see para. 107 below).[48]

38. Pangaea is a publishing network for geoscientific and environmental data. It is an open access library for the archival or publication of data.[49] The projects currently contained within the network include the census of Antarctic marine life, evolution and biodiversity in the Antarctic and "Evolution et conservation de la biodiversité marine face au changement global".

39. The SeamountsOnline website[50] provides data on species that have been observed or collected from seamounts worldwide. The website is designed to facilitate research on seamount ecology and to act as a resource for managers.

40. DNA barcoding is a formative technique for using a part of a DNA sequence from a particular position in the genome as molecular diagnostic for species-level identification. As the technique uses only a shorter sequence, results can be obtained

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[42] http://bure.unep-wcmc.org/marine/highseas/viewer.htm.

[43] B. De Mol et al., "HERMES-GIS: a tool to connect scientists", Oceanography, vol. 22 (1), 2009.

[44] See www.ub.edu/hermes.

[45] Document UNEP/CBD/SBSTTA/13/INF/12, available at www.cbd.int/marine/documents.shtml.

[46] Ibid., annex IX.

[47] www.bioprospector.org/bioprospector.

[48] Contribution of UNU-IAS.

[49] www.pangaea.de.

[50] http://pacific.sdsc.edu/seamounts.

more easily than for full genome sequencing.[51] The barcode of life database[52] is an online database for all species, and includes the fish barcode of life initiative.[53]

41. The Scientific Committee on Antarctic Research has created a marine biodiversity information network, which is a web portal containing new and existing information on Antarctic marine biodiversity. It will feed its data into larger initiatives, such as the Ocean Biographic Information System and the Global Biodiversity Information Facility.[54]

42. *Modelling*. Modelling technologies are used to extrapolate information beyond areas where data has been collected, or to create predictions of future events on the basis of current and historical readings. Modelling is another tool used to help inform decision makers and guide research.

43. AquaMaps[55] is a standardized series of maps displaying large-scale predictions of the natural occurrence of marine species. The modelling uses known occurrence records of the species and extrapolates them on the basis of the environmental resilience of the given species and the local environmental conditions. The initial models are then subject to expert review to reduce any bias or errors which may have occurred in the modelling process. The models currently cover the distribution of 9,000 species of fish, marine mammals and invertebrates for all ocean areas.

B. Economic, socio-economic, environmental and legal aspects of relevant activities and uses

44. Activities and uses of the oceans and seas relevant to marine biodiversity beyond areas of national jurisdiction include exploitation of resources (e.g. fisheries, hydrocarbons, minerals, genetic resources); shipping; operation of platforms for various purposes (e.g. research, military); disposal of waste; laying of pipelines and cables; and emerging uses, such as climate change mitigation (e.g. carbon sequestration, ocean fertilization).

45. Human activities in areas beyond national jurisdiction can expand knowledge of remote ecosystems and aid the search for new food and energy sources. These activities make a significant contribution to human well-being and the world's economy, in terms of production of goods and services, international trade and as a source of livelihood for millions of people. The recreational, cultural and other uses of the oceans are also of value as a source of well-being for people around the world.

46. Coastal areas are under pressure from a range of activities and sources of pollution. As a result, an increasing number of human activities are taking place beyond areas of national jurisdiction and target resources in those areas. Irrespective

[51] www.barcoding.si.edu, www.scor-int.org/Tech_Panel/Molecular_Techniques_Paper.pdf.

[52] www.barcodinglife.org.

[53] www.fishbol.org.

[54] www.scarmarbin.be. More information on the Ocean Biographic Information System can be found in A/60/63/Add.1, para. 76. Information about the Global Biodiversity Information Facility is available at www.gbif.org.

[55] K. Kaschner et al., 2008 AquaMaps: Predicted range maps for aquatic species, version 10/2008, available at www.aquamaps.org.

of whether those uses of the oceans and their resources take place within or beyond areas of national jurisdiction, they affect marine biodiversity beyond areas of national jurisdiction. Pollutants and contaminants, both in coastal areas and beyond, move through the oceans by the effects of currents and sink to the deepest areas. These pollutants and contaminants, which result from land and sea-based activities, include waste and litter such as discarded fishing gear, chemicals, oil, radioactive materials and emissions from ships. Diversity is also affected by invasive alien species, climate change, ocean acidification and ozone depletion.[56] All of the foregoing can result in extinction of species, habitat degradation and changes in biochemical conditions that can disrupt entire food chains.[57]

47. Any human interaction with an ecosystem has potentially destabilizing effects on the ecosystem and may result in losses of biodiversity and ecosystem integrity or resilience, with corresponding losses in goods and services.[58] The reversibility of those effects is, however, varied and depends on a range of factors, including the frequency and intensity of the activities as well as the combined impact of various activities. It is, therefore, important to consider anthropogenic activities beyond areas of national jurisdiction not only in light of their immediate benefits but also in light of their potential adverse effects, which may diminish the capacity of marine ecosystems to provide goods and services for present and future generations.

1. Fishing activities and developments related to marine living resources

48. The resources available in fisheries worldwide generate significant economic activity for many, from artisanal fishers to industrial fishing fleets. Fisheries provide a vital source of food, employment and opportunities for sustainable development and trade, in particular for developing States. FAO has reported that the total capture and aquaculture fisheries production in 2006 was approximately 143.6 million tons, of which global marine capture production was 81.9 million tons. The global volume of catches of fish stocks occurring primarily in the high seas in 2006 was reported to be approximately 10.5 million tons. From 2003 to 2006, catches of deep-water species decreased (from 3.9 to 3.3 million tons), whereas overall catches of oceanic tunas were still growing (approximately 5.2 million tons in 2006) and the catches of other epipelagic oceanic species were stable (approximately 2 million tons).

49. The total production supplied about 110 million tons of fish and fish products for human consumption. It is estimated that fish products account for at least 50 per cent of total animal protein intake in some small island developing States and developing coastal States.[59]

50. More than 37 per cent of the total production of fish and fishery products enters international trade, and the value of world exports reached $85.9 billion in 2006. The value of such exports has increased by 32.1 per cent in real terms from 2000 to 2006. The fishery net exports of developing countries continue to be of vital economic importance, having grown from $1.8 billion in 1976 to $24.6 billion in

[56] UNEP, "Deep-sea biodiversity and ecosystems: a scoping report on their socio-economy, management and governance", 2007.

[57] Ibid.

[58] Ibid.

[59] FAO, *The State of World Fisheries and Aquaculture 2008*.

2006. The fish production industry, including the secondary fishing sector, employs approximately 170 million.[60]

51. Fishing is one of the anthropogenic activities that have the most significant impacts on marine biodiversity in areas within and beyond national jurisdiction. These impacts include overfishing of stocks; habitat degradation from destructive fishing practices; incidental capture of non-target species, including endangered species; and other impacts on the conservation and sustainable use of marine biodiversity.[61] For example, FAO has reported that overall, some 80 per cent of monitored stocks were overexploited, fully exploited or depleted and recovering from depletion. The situation seemed more critical in respect of some straddling fish stocks, highly migratory fish stocks and other fishery resources exploited solely or partly in the high seas.[62] Earlier reports of the Secretary-General have described, in particular, the adverse impacts of illegal, unreported and unregulated fishing and the ecosystem effects of insufficiently selective fishing gear, such as bottom trawl nets, on marine biodiversity and ecosystems, including vulnerable marine ecosystems.[63]

52. The practices described above, together with other impediments to sustainable fisheries, have reduced the economic opportunities associated with the conservation and management of marine biodiversity beyond areas of national jurisdiction. A joint study carried out by the World Bank and FAO, published in 2008, estimated that the difference between the potential and actual net economic benefits of marine fisheries was approximately $50 billion per year, and improved fisheries governance (see paras. 123, 132, 148, 154-156, 162-164, 179-182, 187-188, 213, 217-218, 221, 225 and 249 below) could capture a substantial part of this loss.[64]

53. In view of the serious consequences and losses resulting from the above-mentioned practices and with a view to improving fisheries governance, several initiatives have been undertaken within the framework of the United Nations system and regional fisheries management organizations and arrangements, as described below.

54. . *Illegal, unreported and unregulated fishing*. Recent global initiatives to combat illegal, unreported and unregulated fishing have included a focus on port State measures and flag State performance. In 2008, FAO initiated a process for the negotiation of a legally binding instrument on port State measures, which would establish global minimum standards to combat illegal, unreported and unregulated fishing in order to address the unwillingness or inability of some flag States to fulfil their responsibilities in respect of fishing vessels flying their flags. In June 2009, FAO convened an expert consultation on flag State performance. The expert consultation examined possible c iteria for the assessment of flag State performance, processes for conducting assessments, possible actions against vessels flying the flags of States not meeting established performance criteria, and assistance to developing countries to improve their performance as flag States (see paras. 179-182 below).[65]

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[60] Ibid.

[61] Ibid.

[62] Ibid.

[63] See A/59/62/Add.1, paras. 295-300, A/59/298, paras. 72-98, A/60/63/Add.1, paras. 132-146, A/62/260, paras. 60-96 and A/62/66/Add.2, paras. 14-27.

[64] World Bank, "The sunken billions: the economic justification for fisheries reform", 2008.

[65] The report of the meeting was not available at the time of writing.

55. At the regional level, regional fisheries management organizations and arrangements continue to take steps to combat illegal, unreported and unregulated fishing, including through the development and exchange of "black lists" of vessels suspected of engaging in such fishing, cooperation for mutual recognition of "black lists", development of registers of vessels authorized to fish in respective regulatory areas, measures concerning flag State control, trade-related measures and the development of port State measures.[66] In addition, the parties to the 1982 Nauru Agreement Concerning Cooperation in the Management of Fisheries of Common Interest concluded a third implementing arrangement on 22 August 2008, which contains a range of measures that apply to licensed foreign fishing vessels within areas of national jurisdiction and beyond and enhance the ability of coastal States to monitor and control licensed fishing vessel activity and to combat illegal, unreported and unregulated fishing within those areas.[67] In a statement of commitment adopted in July 2008, the ministers responsible for marine fisheries of the Southern African Development Community resolved to take a broad range of measures to deter and discourage illegal, unreported and unregulated fishing.[68]

56. *Adverse impacts of bottom fisheries.* Following the adoption of General Assembly resolutions 59/25 and 61/105, considerable attention has been drawn to the impacts of bottom fisheries on marine ecosystems, including those beyond areas of national jurisdiction. The General Assembly, in order to ensure the implementation of resolution 61/105 (see also paras. 121, 213 and 217 below), decided to conduct a review at its sixty-fourth session of the actions taken by States and regional fisheries management organizations and arrangements to give effect to paragraphs 83 to 90 of the resolution in order to address the impacts of bottom fishing on vulnerable marine ecosystems, with a view to making further recommendations, where necessary. To facilitate the Assembly's review detailed information regarding the measures taken by flag States and regional fisheries management organizations and arrangements with the competence to regulate bottom fisheries is provided in the report of the Secretary-General prepared in cooperation with FAO (see A/64/305).

57. In August 2008, FAO adopted the International Guidelines for the Management of Deep-Sea Fisheries in the High Seas.[69] The Guidelines have been developed for fisheries exploiting deep-sea fish stocks beyond areas of national jurisdiction, including fisheries with the potential to have significant adverse impacts on vulnerable marine ecosystems. The Guidelines provide tools to facilitate and encourage efforts to ensure the sustainable use of marine living resources exploited by deep-sea fisheries, the prevention of significant adverse impacts on deep-sea vulnerable marine ecosystems and the protection of the biodiversity of these ecosystems.

58. In addition, FAO has developed a programme relating to deep-sea activities to assist States, entities, the fishing industry and regional fisheries management organizations and arrangements in the implementation of the Guidelines. The overall objective of the programme is to improve current management systems

[66] A/62/260, paras. 119-125 and A/63/128, paras. 92, 95-96, 99 and 100.

[67] Contribution of FFA.

[68] See A/63/63/Add.1, para. 126.

[69] FAO, *Report of the Technical Consultation on International Guidelines for the Management of Deep-Sea Fisheries in the High Seas*, FAO Fisheries and Aquaculture Report No. 881, 2009.

through more and better information, engagement and communication among stakeholders and capacity-building. The programme has four main components: support tools for the implementation of the Guidelines, a vulnerable marine ecosystem database, support for management activities in areas without regional regulation and global coordination, monitoring, evaluation and dissemination of information.[70]

59. *By-catch and adverse impacts on marine biodiversity*. Concern has been expressed by fishery managers and environmental groups alike that by-catch and discards may be contributing to overfishing and altering the structure of marine ecosystems. It is now widely believed that by-catch should be minimized to levels approaching insignificance.[71] At the twenty-eighth session of the FAO Committee on Fisheries in March 2009, support was expressed for a proposal to develop international guidelines on by-catch management and reduction of discards.[72]

60. IWC noted in its contribution that fisheries by-catch and ship strikes pose a major threat to some populations of whales and other cetaceans, including beyond areas of national jurisdiction (see also para. 165 below). IWC estimates a limit for the number of non-natural removals, in addition to the catch limit for commercial whaling. The IWC Scientific Committee is exploring modalities for estimating by-catch, including fisheries data, observer programmes and genetic data from market sampling. It has been collaborating with FAO in the collation of relevant fisheries and by-catch data with the aim of identifying fisheries where further monitoring would be valuable.

61. At its ninth meeting, held in December 2008, the Conference of the Parties to the Convention on the Conservation of Migratory Species of Wild Animals adopted a resolution[73] in which it requested the parties to mitigate the effect of by-catch on migratory species and to assess the best practices in that regard. Also, the Conference of the Parties highlighted the importance of monitoring, data-sharing and the implementation of existing action plans concerning by-catch. The secretariat of the Convention was requested to closely liaise with regional fisheries management organizations to, inter alia, share information on the impact of their respective fisheries on migratory species listed under the Convention and on their monitoring and mitigation measures.[74]

62. Regional fisheries management organizations and arrangements have taken measures to reduce by-catch of associated and non-target species (see also A/61/154 and A/62/260). For example, ICCAT reported that it had adopted several measures to conserve shark populations and sea turtles associated with target fisheries, as well as measures to reduce the incidental catch of seabirds in longline fisheries. In addition, the ICCAT Sub-Committee on Ecosystems is assessing the potential impact of tuna fisheries in the Atlantic Ocean on seabird populations.[75]

63. *Other developments*. APFIC reported that the countries of South and South-east Asia were promoting and expanding fishing further ashore from their coasts,

[70] Contribution of FAO.

[71] United Nations Environment Programme, note 56 above.

[72] FAO, *Report of the twenty-eighth session of the Committee on Fisheries*, Fisheries and Aquaculture Report No. 902, 2009.

[73] Resolution 9.18.

[74] Contribution of the secretariat of the Convention.

[75] Contribution of ICCAT.

including deep-sea fisheries, which entailed the need to develop technologies and human capacity to ensure that harvesting, processing and marketing of these resources was effective, efficient and environmentally responsible.[76]

64. FFA observed that it continued to work to strengthen conservation and management efforts, including through the promotion of the ecosystem approach to fisheries, and greater knowledge of fish stocks and other marine living resources beyond areas of national jurisdiction.[77] NPAFC recalled that it had contributed to the implementation of General Assembly resolution 46/215 of 20 December 1991 on a global moratorium on large-scale pelagic driftnet fishing by prohibiting direct fishing for anadromous fish in high-seas areas of the North Pacific Ocean.[78]

65. Discussions and preparations have been ongoing in the context of the Convention on the Conservation of Migratory Species of Wild Animals for a new global agreement to protect sharks. An action plan is in preparation and will provide the foundation for the finalization of the agreement in 2009. A draft agreement for marine turtles in the Pacific Islands region is also being developed. Its objectives will include monitoring, research, community outreach and awareness-raising.[79]

2. Shipping activities

66. Shipping accounts for up to 90 per cent of global trade by weight and, therefore, plays a very important role in underpinning the global economy by providing a safe and efficient way to move goods and raw materials cheaply, in large quantity, around the world. It also plays a critical role in sustainable development and in the economies of both developed and developing States.[80] Developing countries now lead the world in some of the shipping industry's most important ancillary services, including the supply of sea-going manpower, the registration of ships and ship recycling. They also play a significant part in ship-owning and operating, shipbuilding and port services, among others.[81]

67. However, marine biodiversity, including beyond areas of national jurisdiction, can be impacted by oil pollution, air pollution and greenhouse gas emissions, invasive species, noise, collisions and chemical pollution caused by shipping activities. Efforts to address some of these problems are outlined below.

68. *Oil pollution*. In spite of the rare major accident, the overall trend in the number and size of oil spills associated with shipping each year is improving.[82] Notwithstanding this trend, the impact of oil pollution on the marine environment and marine biodiversity beyond areas of national jurisdiction remains a serious

[76] Contribution of APFIC. The FAO/APFIC Workshop on Assessment and Management of the Offshore Resources of South and Southeast Asia was held in Bangkok in June 2008. See www.apfic.org.

[77] Contribution of FFA.

[78] Contribution of NPAFC.

[79] Contribution of the secretariat of the Convention.

[80] IMO document MEPC 59/4/Add.1.

[81] Regular reviews of developments in the shipping industry are provided in the *Review of Maritime Transport*, published annually by the United Nations Conference on Trade and Development.

[82] "World Maritime Day 2007, IMO's response to current environmental challenges", background paper.

concern.[83] IMO has adopted a number of measures in the context of annex I to MARPOL to reduce pollution of the marine environment from oil, which also apply beyond areas of national jurisdiction. Amendments adopted by the Marine Environment Protection Committee of IMO to annex I concerning prevention of pollution during transfer of oil cargo between oil tanks at sea may further reduce the impacts of oil spills on marine biodiversity.[84]

69. *Air pollution*. Emissions of sulphur oxides, nitrogen oxides and particulate matter from ocean-going ships contribute to ambient concentrations of air pollution and cause adverse public health and environmental effects, including ocean acidification and eutrophication.[85] The extent to which these emissions impact marine biodiversity beyond areas of national jurisdiction requires further study.

70. Amendments to the MARPOL annex VI regulations to reduce harmful emissions from ships were adopted by IMO in 2008. They will require a progressive reduction in emissions of sulphur oxides, nitrogen oxides and particulate matter from ships.[86]

71. *Greenhouse gas emissions*. Compared to other modes, shipping has generally been shown to be an energy-efficient means of transportation. However, emissions of carbon dioxide from shipping have also led to positive radiative forcing, which contributes to climate change (see paras. 98-101 below). A 2009 IMO study has indicated that by 2050, in the absence of adequate policies, ship emissions may grow by 150 per cent to 250 per cent, compared to the emissions in 2007, as a result of the growth in shipping.[87] In addition, international shipping was estimated to have emitted 843 million tons of carbon dioxide in 2007, or about 2.7 per cent of global emissions.[88]

72. At its fifty-eighth session, the Marine Environment Protection Committee of IMO considered follow-up actions to resolution A.963(23), on IMO policies and practices related to the reduction of greenhouse gas emissions from ships,[89] as well as the findings of phase 1 of the updated 2000 IMO study on greenhouse gas emissions from ships. The final report identified a significant potential for reduction of greenhouse gas emissions through technical and operational measures which, if implemented, could increase efficiency and reduce the emissions rate by 25 per cent to 75 per cent below current levels.[90]

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[83] A/62/66/Add.2, paras. 31-33.

[84] Draft report of the Marine Environment Protection Committee on its fifty-ninth session, IMO document MEPC 59/WP.12.

[85] Report of the Marine Environment Protection Committee on its fifty-eighth session, IMO document MEPC 58/23/Add.1, annex 13.

[86] Report of the Marine Environment Protection Committee on its fifty-eighth session, IMO document MEPC 58/23 and Add.1, annex 13. Also see A/63/63/Add.1, paras. 173-177.

[87] Second IMO greenhouse gas study, 2009, IMO document MEPC 59/INF.10. The first IMO study of greenhouse gas emissions from ships was published in 2000 as document MEPC 45/8.

[88] Updated 2000 study on greenhouse gas emissions from ships, IMO document MEPC 58/INF.6.

[89] Report of the Marine Environment Protection Committee on its fifty-eighth session, IMO document MEPC 58/23, and note by the secretariat on prevention of air pollution from ships, IMO document MEPC 59/4/Add.1. Also see report on the outcome of the second intersessional meeting of the Working Group on Greenhouse Gas Emissions from Ships, 9-13 March 2009, IMO document MEPC 59/4/2.

[90] Second IMO greenhouse gas study, 2009, IMO document MEPC 59/INF.10.

73. *Invasive alien species*. Invasive alien species continue to harm ecosystem services, livelihoods and economies throughout the world, and have been identified as one of the four greatest threats to the marine environment. Growth in global trade, transport and travel, including tourism, while generating revenues, can also come at a cost to human and animal health and has socio-economic and ecological impacts. A number of ocean-related activities and phenomena can lead to the unintentional introduction of invasive alien species, including ballast water exchange on ships, biofouling of ship bottoms and mariculture.[91]

74. The exchange of ballast water beyond areas of national jurisdiction can help prevent the introduction of invasive species in coastal waters, where they could otherwise cause significant damage.[92] High biodiversity in these areas may help to contain the problem. For example, benthic organisms can contribute to the control of invasive species by ingestion or by competing for available resources, thereby reducing the probability that invasive forms will develop.[93] However, the risks and impacts of this activity on marine biodiversity beyond areas of national jurisdiction are still largely unknown.

75. IMO has adopted guidelines for ballast water sampling and revised guidelines for approval of ballast water management systems, which are intended to assist in the effective implementation of the International Convention for the Control and Management of Ships' Ballast Water and Sediments.[94] Complementing the Global Ballast Water Management Programme, a global industry alliance was recently established to reduce the transfer of harmful invasive species and pathogens via ballast water.[95]

76. *Chemical pollution from ships*. Marine biodiversity beyond areas of national jurisdiction can also be affected by chemicals used in the application of anti-fouling systems on ships. Such systems are used to prevent sea life, such as algae and molluscs, from attaching to the hull and thereby slowing the ship and increasing fuel consumption. However, studies have shown that metallic compounds from anti-fouling paints slowly leach into the sea and can harm marine life and the environment and possibly enter the food chain.[96]

77. Under the International Convention on the Control of Harmful Anti-fouling Systems on Ships, which entered into force on 17 September 2008, ships are not permitted to apply or reapply organotin compounds that act as biocides in their

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[91] A/59/62/Add.1, para. 221, A/60/63/Add.1, para. 158, A/62/66/Add.2, para. 34 and A/63/63/Add.1, paras. 182-190. See also www.imo.org/home.asp. See also press release of the Convention on Biological Diversity, "Celebrating the International Day for Biological Diversity", 22 May 2009.

[92] See www.imo.org/home.asp, and A/59/62/Add.1, para. 57.

[93] United Nations Environment Programme, note 56 above.

[94] Report of the Marine Environment Protection Committee on its fifty-eighth session, IMO document MEPC 58/23, annexes 3 and 4. Eighteen States have so far ratified this Convention, representing about 15.36 per cent of the world's merchant shipping. In accordance with article 18, the Convention will enter into force 12 months after the date on which not less than 30 States, the combined merchant fleets of which constitute not less than 35 per cent of the gross tonnage of the world's merchant shipping, have become party to it.

[95] The Global Industry Alliance for Marine Biosecurity is comprised of IMO, UNDP, GEF and four major private shipping corporations. See http://globallast.imo.org/index.asp.

[96] See www.imo.org/home.asp. One of the most effective anti-fouling paints contains the organotin tributylin, which has been proven to cause deformations in oysters and sex changes in whelks.

anti-fouling systems. Ships must either refrain from carrying such compounds on their hulls or external parts or surface or, in the case of ships that already carry such compounds on their hulls, apply a coating that forms a barrier to prevent them from leaching into the underlying non-compliant anti-fouling systems.[97]

3. Disposal of wastes

78. Previous reports of the Secretary-General have highlighted the extent and impacts of the disposal of wastes in the oceans, including on marine biodiversity beyond areas of national jurisdiction (see, for example, A/60/63/Add.1). The thirtieth Consultative Meeting of Contracting Parties to the London Convention and the third meeting of Contracting Parties to the London Protocol, held in London in October 2008, adopted a number of guidance documents on matters of relevance to the conservation and sustainable use of marine biodiversity, including beyond areas of national jurisdiction (see also paras. 87-91 below and A/64/66/Add.1).[98]

4. Land-based activities

79. Human activities on land are critical to sustaining the economies and development of countries around the world and have numerous socio-economic benefits. However, some of these activities also pose a significant threat to marine ecosystems and biodiversity, including beyond areas of national jurisdiction.[99] Recent activities to address the threats posed by pollution from land-based activities are highlighted in A/64/66, paras. 100-102 and A/64/66/Add.1.

5. Marine scientific research

80. Marine scientific research is essential to improve understanding of ocean ecosystems and provide the necessary basis for sound decision-making (see paras. 12, 22-24, 119 and 192-203 of the present report). However, if not conducted with care, research could have an adverse impact on marine biodiversity and ecosystems, through, for example, the introduction of light, noise, heat, smothering, physical disturbance from sediment removal or spreading, the deposit of debris or chemical or biological contamination.[100] While there has not been any comprehensive assessment of the impacts of marine scientific research on marine biodiversity beyond areas of national jurisdiction, various initiatives are aimed at minimizing such impacts through, in particular, the adoption of voluntary codes of conduct. These have included the Code of Conduct for Marine Scientific Research

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[97] A/63/63, paras. 288-292 and A/63/63/Add.1, paras. 197-201. See, also, www.imo.org/home.asp.

[98] These include the Revised Generic Guidelines for the Assessment of Wastes and Other Matter; Revised Specific Guidelines for the Assessment of Inert, Inorganic Geological Material; London Convention/London Protocol-UNEP Guidelines for the Placement of Artificial Reefs; Guidance on Managing Spoilt Cargoes; Guidance on Best Management Practices for Removal of Anti-Fouling Coatings from Ships, including TBT hull paints; and Guidance for the Development of Action Lists and Action Levels for Dredged Material. See IMO document LC 30/16, para. 0.8.

[99] See A/59/62/Add.1, para. 214, A/60/63/Add.1, paras. 154 and 155 and A/62/66/Add.2, paras. 316 and 317.

[100] A/61/65, para. 18; A/62/66/Add.2, para. 55.

Vessels and the Code of Conduct for Responsible Marine Research in the Deep Seas and High Seas of the OSPAR Maritime Area.[101]

6. Mineral exploration and exploitation

81. Although the potential for seabed mineral mining operations is significant, mining activities in the deep sea are still largely prospective, as a number of factors, mainly of an economic and technological nature, affect the feasibility of deep-sea mining.[102] The Area and its resources are the common heritage of mankind and are administered by the ISA, which is mandated by the United Nations Convention on the Law of the Sea to provide for the equitable sharing of financial and other economic benefits derived from activities in the Area.[103]

82. The main potentially exploitable sources of deep-sea minerals are found in polymetallic manganese nodules, polymetallic sulphides and cobalt-rich ferromanganese crusts.[104] To date, eight exploration contracts have been approved by ISA to allow contractors to prospect and explore for nodules in the Area.[105] Two applications for approval of plans of work for exploration for polymetallic nodules in the areas reserved for the Authority have also been sponsored by Nauru and Tonga on behalf of private sector entities.[106]

83. ISA has sponsored a number of scientific studies and workshops on the seabed environment and the potential effects of mining as a basis to develop measures for the protection of the marine environment. In this regard, the Authority has identified three types of activities with potential for environmental impacts: (a) exploration for commercial deposits; (b) small-scale and prototype tests of commercial recovery mining systems; and (c) metallurgical processing, if it occurs in the Area. A number of impacts of nodule mining have been identified that are likely to harm benthic life to varying degrees, including the crushing of organisms in the path of a mining vehicle, the burial of nearby organisms under sediments stirred up and redistributed,

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[101] A/63/63/Add.1, paras. 106-108. See also International Ship Operators Meeting, Qingdao, China, 17-20 October 2007; A/62/169, paras. 67-80 for the InterRidge statement of commitment to responsible research practices at deep-sea hydrothermal vents; and www.ospar.org/documents/dbase/decrecs/agreements/08-01e_code%20of%20conduct%20marine%20research.doc for the Code of Conduct for Responsible Marine Research in the Deep Seas and High Seas of the OSPAR Maritime Area.

[102] For information on economic aspects of deep seabed mining, see International Seabed Authority, *Technical and Economic Considerations for Mining Cobalt-Rich Ferromanganese Crusts and Polymetallic Sulphide Resources of the international seabed area ("the Area")*, Proceedings of a Workshop held 31 July-4 August 2006 in Kingston, Jamaica; and United Nations/International Seabed Authority, *Marine Mineral Resources: Scientific Advances and Economic Perspectives*, ISBN:976-610-712-2.

[103] See Part XI and Agreement relating to the implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982.

[104] A/60/63/Add.1, paras. 168-173.

[105] For a list of contractors, see www.isa.org.jm/en/scientific/exploration/contractors.

[106] See summary report of the Chairman of the Legal and Technical Commission on the work of the Commission during the fifteenth session, ISBA/15/C/5. See also A/63/63/Add.1, para. 47.

and chemical and physical changes in the water column caused by losses from a lift system and discharge of waste from a surface vessel.[107]

84. Discussions are ongoing on the draft regulations on prospecting and exploration for polymetallic sulphides in the Area. The discussions will continue at the sixteenth session of the Authority in 2010, including on the revised regulations on prospecting and exploration for ferromanganese crusts in the Area, which were adopted by the Legal and Technical Commission at the fifteenth session.[108]

7. Other activities, including new uses

85. The oceans are used for a number of other activities and uses, such as the development of renewable energy,[109] aquaculture,[110] laying of submarine cables (see para. 245 below)[111] and deep-sea tourism.[112] The extent to which some of these activities take place beyond areas of national jurisdiction is not clear enough. While those activities and uses can generate economic and socio-economic benefits, they could also adversely impact marine biodiversity beyond areas of national jurisdiction.[113]

86. Particular attention has recently been paid to the development of technological and geo-engineering methods to artificially enhance natural carbon-absorbing processes on land and in the oceans to mitigate climate change. Many of these methods lack proper scientific assessment of their environmental impacts and effectiveness (see paras. 128-133 and 223-224 below).[114] The 2008 meeting of the Working Group recognized the importance of environmentally sound climate change mitigation strategies. In particular, concerns were raised over carbon sequestration and large-scale ocean iron fertilization to mitigate the impact of climate change. The view was expressed that scientific understanding of the role of oceans in regulating

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[107] See the Workshop on Deep-Seabed Polymetallic Nodule Exploration: Development of Environmental Guidelines, Sanya, China, 1-5 June 1998 (www.isa.org.jm/en/home). A list of potential benthic, water-column and upper-water-column impacts during prospecting and exploration for cobalt-rich ferromanganese crusts and polymetallic sulphides are contained in the recommendations of the Workshop for the Establishment of Environmental Baselines at Deep Seafloor Cobalt-Rich Crusts and Deep Seabed Polymetallic Sulphide Mine Sites in the Area for the Purpose of Evaluating the Likely Effects of Exploration and Exploitation on the Marine Environment, held from 16 to 20 September 2004 in Kingston. Also see A/60/63/Add.1, paras. 168-173; IUCN, *Regulatory and Governance Gaps in the International Regime for the Conservation and Sustainable Use of Marine Biodiversity in Areas beyond National Jurisdiction* (2008); and UNEP, note 56 above.

[108] See note 106 above.

[109] World Energy Council, *2007 Survey of Energy Resources*, 2007. The International Energy Agency has developed an implementing agreement on ocean energy to provide a framework for international collaboration in energy technology research and development, demonstration and information exchange. See www.iea-oceans.org.

[110] FAO, note 59 above.

[111] UNEP, note 56 above. It has been estimated that 100,000 kilometres of cables are being laid on the seafloor each year.

[112] See A/59/62/Add.1, paras. 235 and 294.

[113] IUCN, note 107 above. See also A/63/63, paras. 239-246, A/63/63/Add.1, paras. 116-123 and A/59/62/Add.1, paras. 235 and 294.

[114] UNEP, note 56 above. Examples of carbon dioxide sequestration in the ocean include ocean fertilization, direct injection of carbon dioxide to the deep ocean, and mechanical mixing of the water column through pumps.

climate and the impacts on the marine environment of climate change and the technologies used for climate mitigation purposes should be improved.[115]

87. *Ocean fertilization.* At its sixty-third session, the General Assembly welcomed resolution LC-LP.1 (2008) adopted by the Contracting Parties to the London Convention and the London Protocol on the regulation of ocean fertilization. In that resolution, the Contracting Parties agreed, inter alia, that given the present state of knowledge, ocean fertilization activities other than for legitimate scientific research should not be allowed, and that scientific research proposals should be assessed on a case-by-case basis using an assessment framework to be developed by the scientific groups under the London Convention and Protocol.[116]

88. The General Assembly further welcomed decision IX/16 C of the Conference of the Parties to the Convention on Biological Diversity, which addressed the potential impacts of direct human-induced ocean fertilization on marine biodiversity. In decision IX/16 C, the parties to the Convention and others are requested, in accordance with the precautionary approach, to ensure that ocean fertilization activities do not take place until there is an adequate scientific basis on which to justify them (see A/63/63/Add.1, para. 280).

89. The thirty-second meeting of the Scientific Group under the London Convention and the third meeting of the Scientific Group under the London Protocol, in May 2009, continued work on a draft assessment framework for scientific research involving ocean fertilization.[117] Several issues were identified requiring further in-depth discussion by the Scientific Groups, or in-depth consideration by the Contracting Parties to the London Convention and London Protocol.[118] Regarding the preparation of an overview summarizing the current state of knowledge on ocean fertilization, the Scientific Groups noted that scientific overviews were already being prepared by the secretariat of the Convention on Biological Diversity and by IOC, and invited the Contracting Parties to determine whether or not those overviews, when available, would be sufficient for the purposes of the London Convention and London Protocol.[119]

90. *Carbon sequestration.* At their third meeting, the Contracting Parties to the London Protocol agreed that the Protocol should not constitute a barrier to the transboundary movement of carbon dioxide streams between two or more States.[120]

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[115] A/63/79, para. 14. See also A/63/63/Add.1, paras. 278-283 and General Assembly resolution 63/111, para. 115. See also Compilation of recent international statements, agreements and recommendations regarding ocean fertilization, IMO document LC 30/INF.4 and Add.1; decision IX/16 of the Conference of the Parties to the Convention on Biological Diversity; and the Valencia Declaration of the World Congress of Marine Biodiversity, November 2008, available at http://www.marbef.org/worldconference/declaration.php.

[116] General Assembly resolution 63/111, para. 115. See also IMO document LC 30/16, annex 6, resolution LC-LP.1 (2008).

[117] Report of the 1st meeting of the Intersessional Technical Working Group on Ocean Fertilization, IMO document LC/SG-CO2 3/5, annex II.

[118] Report of the 32nd meeting of the Scientific Group under the London Convention and the 3rd meeting of the Scientific Group under the London Protocol, IMO document LC/SG 32/15, including annex 2. The Scientific Groups also considered the outcome of the LOHAFEX ocean iron experiment conducted in the Southern Atlantic Ocean, which concluded that the carbon dioxide drawdown effect of the experiment was low. See also www.awi.de/en/home.

[119] See note 118 above.

[120] IMO document LC 30/16.

The Contracting Parties also adopted a format for reporting on carbon dioxide streams into sub-seabed geological formations under the London Protocol.[121]

91. The third meeting of the Scientific Group under the London Protocol acknowledged that there could be technical issues related to carbon dioxide sequestration in transboundary sub-seabed geological formations that might warrant a review of the carbon dioxide Sequestration Guidelines of 2007.[122]

8. Cross-sectoral impacts

92. While the previous sections include information on the impacts arising from specific activities, this section focuses on the adverse effects common to several activities.

93. *Marine debris*. Marine debris is an obvious sign of the impact of land- and sea-based activities on the marine environment, and is a major concern.[123] FAO and UNEP have estimated that abandoned, lost or otherwise discarded fishing gear in the oceans make up approximately 10 per cent (640,000 tons) of all marine litter. The problem has worsened due to the increased scale of global fishing operations and the introduction of highly durable fishing gear.[124]

94. An overview of available information on marine litter from 12 regional programmes participating in the UNEP global initiative on marine litter revealed a widespread lack of systematic scientific knowledge regarding marine litter, which has hampered development and implementation of effective mitigation actions.[125] In response to the lack of adequate science-based monitoring and assessment programmes relating to marine litter, UNEP and IOC have developed guidelines to address this problem.[126] UNEP also reported that there was an urgent need to approach the issue of marine litter through better enforcement of laws and regulations, expanded outreach and educational campaigns and the employment of strong economic instruments and incentives.[127] Economic tools and strategies to address problems relating to marine litter are set out in the UNEP Guidelines on the Use of Market-based Instruments to Address the Problem of Marine Litter.[128] Other recent developments to address marine debris have been highlighted in earlier reports of the Secretary-General.[129]

95. *Ocean noise*. Human activities in the oceans are responsible for generating ever-increasing levels of underwater noise, and there is increasing concern regarding the potential threat to marine living resources posed by noise proliferation. Sources of anthropogenic ocean noise include commercial and non-commercial shipping, air guns used to carry out seismic surveys, military sonar, underwater detonations and

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[121] Ibid., annex 8.

[122] See note 118 above.

[123] See A/59/62/Add.1, paras. 212-213, A/60/63/Add.1, para. 155 and A/62/66/Add.2, paras. 39-47.

[124] FAO and UNEP, "Abandoned, lost or otherwise discarded fishing gear", Regional Seas Reports and Studies No. 185, FAO Fisheries and Aquaculture Technical Paper No. 523, 2009.

[125] UNEP, *Marine Litter: A Global Challenge*, 2009.

[126] UNEP and IOC, *Guidelines on Survey and Monitoring of Marine Litter*, Regional Seas Reports and Studies No. 186, IOC Technical Series No. 83 (2009).

[127] UNEP, *Global threat, global challenge: review and analysis of UNEP's global initiative on marine litter*, 2009.

[128] UNEP, 2009.

[129] See A/63/63/Add.1, para. 229 and A/64/66, paras. 104-106.

construction, resource extraction and fishing activities. Offshore wind farms have also been identified as sources of noise, and other new technology to capture marine renewable energy, for example wave and tidal generators, may be additional sources.[130] While significant economic and socio-economic benefits are associated with these activities, they can, even when carried out within areas of national jurisdiction, generate noise that may impact marine living resources beyond areas of national jurisdiction.

96. In many forums there have been continuing calls for research, monitoring and efforts to minimize the risk of adverse effects of ocean noise.[131] In 2008, the IMO Marine Environment Protection Committee approved the inclusion of a new item in its agenda concerning noise from commercial shipping and its adverse impacts on marine life. The terms of reference of the correspondence group established by the Committee are to identify and address ways to minimize the introduction of incidental noise into the marine environment from commercial shipping, reduce the potential adverse impact on marine life and, in particular, develop voluntary technical guidelines for ship-quieting technologies as well as potential navigation and operational practices.[132]

97. The ninth meeting of the Conference of the Parties to the Convention on the Conservation of Migratory Species of Wild Animals adopted resolution 9.19 on adverse anthropogenic marine/ocean noise impacts on cetaceans and other biota, in which, inter alia, parties are requested to control the impact of anthropogenic noise on marine species and to apply appropriate mitigation measures to prevent impacts from high-intensity noise sources, such as sonars, especially in areas known or suspected to be important habitats of sensitive species.[133]

98. *Climate change*. Knowledge of the impacts of climate change on the oceans and their biodiversity is still expanding, but changes in water chemistry and temperature alone may threaten a number of vulnerable ecosystems, including cold-water coral reefs, and lead to great shifts in biodiversity, especially in sensitive zones such as the polar areas. Many marine organisms, in particular those inhabiting the deep sea, tend to live within narrow temperature ranges and may be unable to adapt to sudden changes.[134]

99. In its decision IX/16, on biodiversity and climate change, the Conference of the Parties to the Convention on Biological Diversity decided that climate change considerations should be integrated into each programme of work, including the programme of work on marine and coastal biodiversity.

100. The Manado Declaration adopted at the World Ocean Conference in May 2009 recognizes the crucial role of oceans as a component of the global climate system and in moderating its weather systems. The Declaration addresses the need to

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[130] Report of the 16th meeting of the Advisory Committee on the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas, para. 66. See also report of the Scientific Committee of IWC, document IWC/61/Rep 1, para. 12.5.2.

[131] See A/59/62/Add.1, para. 220, A/60/63/Add.1, para. 159 and A/62/66/Add.2, paras. 51-54.

[132] Report of the Marine Environment Protection Committee on its fifty-eighth session, IMO document MEPC 58/23, paras. 19.1-19.5. See also A/64/66/Add.1.

[133] Contribution of the secretariat of the Convention.

[134] UNEP, note 56 above. See also A/60/63/Add.1, paras. 149-153, A/62/66, paras. 326-336, A/62/66/Add.1, paras. 225-241, A/62/66/Add.2, paras. 57-64, A/63/63, paras. 354-364 and A/63/63/Add.1, paras. 259-283.

commit to long-term conservation, management and sustainable use of marine living resources; establish national strategies to sustainably manage marine and coastal ecosystems and enhance their resilience; reduce marine pollution; increase understanding and information exchange on coasts, oceans and climate change, particularly in developing countries; and establish and effectively manage marine protected areas, including resilient networks. The Declaration also recognizes the importance of improving understanding of the impact of climate change on the ocean and the need to consider ocean dimensions to inform adaptation and mitigation strategies as appropriate. It invites participants to consider how coastal and ocean dimensions could be appropriately reflected at the fifteenth meeting of the Conference of the Parties to the United Nations Framework Convention on Climate Change in 2009.[135]

101. UNU-IAS is currently in the process of undertaking a policy-relevant desktop review of scientific publications relating to the impacts of climate change on ecosystems and species beyond areas of national jurisdiction. This review will be available in early 2010 and will include a summary of proposed management and policy responses to climate change.[136]

C. Marine genetic resources

102. This section focuses on recent developments relating to marine genetic resources from a multidisciplinary perspective and provides background information on issues raised during the 2008 meeting of the Working Group but not addressed in detail in previous reports of the Secretary-General.

103. Unlike fish, the primary interest in marine genetic resources is not as a source of food but for the information they harbour, which can be replicated and used in a number of applications. In recent years, increased attention has been paid to the potential of micro-organisms such as bacteria and fungi. For example, bacteria found in unique and often extreme habitats in the oceans in terms of temperature, toxicity, acidity and pressure display adaptations to these environments which can subsequently be harnessed in biotechnological applications. As key players in the nutrient cycle, where they act as decomposers, marine micro-organisms play an essential role in degrading toxins and other pollutants of both natural and human origin. They also have a role in climate regulation, ocean biomass turnover and the maintenance of marine biodiversity. Research on and exploitation of marine genetic resources, including those isolated from organisms found beyond areas of national jurisdiction, provide a number of benefits to society. For example, research on marine genetic resources allows us to further our understanding of the ecology, biology and physiology of marine species and organisms and the ecosystems of which they are part. Biotechnological applications have also led to the development of novel products and processes for application in a range of sectors, including

[135] International Institute for Sustainable Development, *World Ocean Conference Bulletin*, final issue, vol. 162, No. 5, 18 May 2009. The text of the Declaration is available at http://woc2009.org/home.php.

[136] Contribution of UNU-IAS.

pharmaceuticals, enzymes, biofuels, cosmetics, agrichemicals and environmental remediation.[137]

104. Assessing the actual or potential total economic value of marine genetic resources beyond areas of national jurisdiction remains difficult owing to limited information on the exact location of the samples used, for example, in drug discovery or the development of enzymes used for industrial purposes. Various valuation methods are available (see para. 127),[138] some of which are more relevant than others when considering the valuation of marine genetic resources. Parallels can be made, for example, with global trends in the biotechnology sector, but such a method remains largely speculative in a context of limited readily available information specific to the marine biotechnology sector.

105. Previous reports of the Secretary-General have provided information on the nature of marine genetic resources, features and organisms of interest in the search for marine genetic resources and the geography of the sampling effort. They have also addressed the scientific and commercial interests in marine genetic resources, technological issues, valuation of the services provided by marine genetic resources, environmental aspects, and legal issues.[139] Following discussions in the Working Group[140] and the recognition by the General Assembly of the importance of research on marine genetic resources (see paras. 13, 193 and 199 of the present report),[141] a number of activities have been undertaken to strengthen the knowledge base related to marine genetic resources.

106. Initiatives, generally undertaken as public-private partnerships, continue to provide knowledge to assess and map marine biodiversity, including at the genetic level, such as the Census of Marine Life at the global level and the Hermes project at the regional level (see paras. 16, 20, 34, 190 and 202 of the present report).[142] The global ocean sampling expedition of the J. Craig Venter Institute has also continued to sample, sequence and analyse the DNA of marine micro-organisms throughout the oceans, including in ecosystems beyond areas of national jurisdiction. Throughout 2007 and 2008, the expedition focused on diverse and, in some cases, extreme environments such as hydrothermal vents, high saline ponds and the polar ice of the Antarctic.[143] The data resulting from the expedition so far are publicly available from Genbank and the Community Cyberinfrastructure for Advanced Marine Microbial Ecology Research and Analysis, an online database and high-speed computational resource.[144]

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[137] See A/62/66, paras. 160-168 and D. Leary et al., "Marine genetic resources: a review of scientific and commercial interest", *Marine Policy*, vol. 33, 2009. For experiments for the production of biofuels from marine microalgae, see D. Song et al., "Exploitation of oil-bearing microalgae for biodiesel", *Chinese Journal of Biotechnology*, vol. 24(3), 2008; Bridge Marine Science Group, *Global Marine News*, Issue 2, July 2009; and "Exxon to invest millions to make fuel from algae", *The New York Times*, 13 July 2009.

[138] See A/60/63/Add.1, paras. 98-118 and A/62/66/Add.2, paras. 209-222.

[139] See A/60/63/Add.1, A/62/66, paras. 126-249 and A/62/66/Add.2, paras. 187-248.

[140] See A/61/65 and A/63/79, paras. 32-39.

[141] A/63/111, para. 124.

[142] See www.coml.org/ and www.eu-hermes.net/intro.html.

[143] See www.jcvi.org/cms/research/projects/gos/overview/.

[144] See "Global ocean sampling expedition, fact sheet — expedition overview", available at www.jcvi.org/cms/research/projects/gos/past-voyages/.

107. With regard to the uses of marine genetic resources, UNU-IAS has undertaken work to assess the extent of marine bioprospecting worldwide, including studies (see the annex to the present report) and the development, in collaboration with UNESCO, of a marine biological prospecting information resource, which includes a searchable database of research and commercialized products arising from biological samples sourced from the world's oceans and coastal areas. Also included are tools and resources related to legislation, customary law, declarations, access and benefit-sharing, intellectual property, economics and valuation.[145] In many cases information relating to the exact site of collection is not included in patent applications, and while a number of products now on the market were developed on the basis of organisms sourced from deep seabed habitats (e.g. hydrothermal vents and deepwater sponges), it is believed that a majority were collected within exclusive economic zones.[146] Some of the research also provides information on the scientific community's perspectives on marine genetic resources, including their potential uses and value.[147]

108. From a technological perspective, efforts continue to be made to develop improved methods of purification, isolation, screening and identification of novel bioactive compounds from marine organisms, and to better understand the role and functions of marine micro-organisms in ocean ecosystems. In particular, work is ongoing to improve metagenomic screening and libraries, to reduce genetic erosion and shorten lead times in drug discovery and to scale up natural product purification from analytical to pilot level.[148] Work also continues regarding ways of tracking and monitoring genetic resources through the use of persistent global unique identifiers. A tracking system would allow each genetic resource and its derivatives, such as sequence data, to be tracked from the point of origin through one or more users.[149]

109. In respect of policy developments, in the context of its work on the development of an international regime on access and benefit-sharing, the Working Group on Access and Benefit-sharing of the Convention on Biological Diversity, in April 2009, continued its consideration of whether the regime would encompass marine genetic resources beyond areas of national jurisdiction within its scope. Options on the relationship of the international regime to other international agreements also remain under discussion.[150]

110. Work on the intellectual property aspects of genetic resources is continuing in the context of WIPO, including its Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore. At its March

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[145] The Bioprospecting resource tool can be accessed through www.bioprospector.org/bioprospector/.

[146] Contribution of UNU-IAS.

[147] D. Leary et al., "Marine genetic resources: a review of scientific and commercial interest", *Marine Policy*, vol. 33, 2009.

[148] See presentations at the fourth International Conference on Marine Biotechnology, Tromsø, Norway, 24 and 25 February 2009, available at www.bioprosp.no/.

[149] Study on the identification, tracking and monitoring of genetic resources, UNEP/CBD/WG-ABS/7/INF/2.

[150] Report of the seventh meeting of the Ad Hoc Open-Ended Working Group on Access and Benefit-Sharing, UNEP/CBD/WG-ABS/7/8. The Working Group had under its consideration a "Study on the relationship between an international regime on access and benefit-sharing and other international instruments and forums that govern the use of genetic resources — the Antarctic Treaty System and the United Nations Convention on the Law of the Sea", UNEP/CBD/WG-ABS/7/INF/3/Part.3.

2009 session, the WIPO Standing Committee on the Law of Patents considered key substantive issues relating to patent law and practice. In particular, the Committee requested further work on exclusions from patentable subject matter and exceptions and limitations to the rights, as well as dissemination of patent information, including through databases.[151]

111. Discussions on disclosure of origin of genetic resources also continue in the context of the World Trade Organization.[152]

112. At the 2008 meeting of the Working Group, several delegations expressed interest in considering a proposal to use the multilateral system developed under the International Treaty on Plant Genetic Resources for Food and Agriculture as a possible reference point for discussions on practical measures related to marine genetic resources. While open to considering practical measures, several delegations underlined the importance of also continuing the discussions on the legal regime.[153]

113. The Treaty's objectives are the conservation and sustainable use of plant genetic resources for food and agriculture[154] and the fair and equitable sharing of benefits derived from their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security (article 1). Parties to the Treaty are required to promote an integrated approach to the exploration, conservation and sustainable use of such resources (article 5).[155] Through the Treaty, parties have established a multilateral system to facilitate access to the resources, and to share the benefits of their utilization in a fair and equitable way (article 10), including through information exchange, access to and transfer of technology, capacity-building and the sharing of the benefits arising from commercialization (article 13). Access to genetic materials is through the collections in the world's gene banks. Pursuant to article 12 of the Treaty, access is provided solely for the purpose of utilization and conservation for research, breeding and training for food and agriculture, provided that such purpose does not include chemical, pharmaceutical and/or other non-food/feed industrial uses. Recipients cannot claim any intellectual property or other rights that limit facilitated access to the resources, or their genetic parts or components, in the form received from the multilateral system. Access to resources protected by intellectual and other property rights shall be consistent with relevant international agreements, and with relevant national laws. Access is facilitated through the use of a standard "material transfer agreement". The Treaty also includes a number of supporting components to the system, including international plant genetic resources networks and a global information system (articles 16 and 17).

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[151] Standing Committee on the Law of Patents, thirteenth session, summary by the Chair, WIPO document SCP/13/7.

[152] www.wto.org/english/news_e/news08_e/trips_28oct08_e.htm.

[153] A/63/79, para. 38.

[154] For the purposes of the Treaty, "plant genetic resources for food and agriculture" means any genetic material of plant origin of actual or potential value for food and agriculture. "Genetic material" is defined as any material of plant origin, including reproductive and vegetative propagating material, containing functional units of heredity (article 2).

[155] The multilateral system applies to over 64 crops and forages, which are under the management and control of the parties and in the public domain (article 11). Parties also agree to encourage natural and legal persons within their jurisdiction who hold resources covered by the system to include them in the system (article 11).

114. At its third session, the Governing Body of the Treaty assessed progress in the inclusion in the multilateral system of resources held by natural and legal persons and reviewed the implementation of the multilateral system and operation of the standard material transfer agreement. These matters will be reviewed again at the fourth session of the Governing Body.[156]

115. At the 2008 meeting of the Working Group, the need for capacity-building for developing countries to participate in and benefit from activities related to marine genetic resources beyond areas of national jurisdiction was underlined, as was the need to enhance the sharing of scientific information and results. In that regard, reference was made to the usefulness of the ISA Endowment Fund (see para. 17 above).[157] A number of developments highlighted in paragraphs 12 to 43 and 172 to 182 of the present report are also relevant.

D. Cross-cutting issues

116. This section focuses on recent developments relating to governance, management tools and capacity-building. It also provides background information on integrated ocean management, ecosystem approaches and environmental impact assessments, subjects which were not addressed in detail in previous reports of the Secretary-General on marine biodiversity beyond areas of national jurisdiction but were raised during the 2008 meeting of the Working Group.

1. Management tools

(a) Integrated ocean management and ecosystem approaches

117. The General Assembly has encouraged States to cooperate and coordinate their efforts and take all measures, in conformity with international law, to address impacts on marine ecosystems in areas within and beyond national jurisdiction, and has invited States to consider means to achieve implementation of an ecosystem approach to the management of human activities in the oceans.[158]

118. At the 2008 meeting of the Working Group, some delegations suggested that developing integrated ocean policies, while challenging, might offer a more effective framework for the protection of the marine environment than current arrangements, which tended to focus on assessing and mitigating the environmental impacts of specific activities rather than on the marine environment as a whole.[159]

119. Integrated ocean management can be a platform to build an ecosystem approach to the management of activities beyond areas of national jurisdiction. The latter may involve a change of focus towards science-based management aimed at the conservation and sustainable use of ecosystems, their components and functions. Challenges in the implementation of these approaches relate to the ability to conduct

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[156] See FAO documents IT/GB-3/09/12, IT/GB-3/09/13 and IT/GB-3/09/14. See also report of the third session of the Governing Body of the Treaty (IT/GB-3/09/Report).

[157] A/63/79, para. 35.

[158] Resolution 61/222, para. 119. See also A/61/156.

[159] A/63/79, para. 21.

ocean research and the need to develop reliable management, monitoring, enforcement and compliance regimes.[160]

120. While the present section addresses developments relating to the implementation of integrated management and ecosystem approaches, a number of other developments described in earlier sections are also relevant.

121. An ecosystem approach can be applied to specific sectors as well as across sectors. Examples of developments in international forums towards the implementation of an ecosystem approach to the management of sectoral activities which have an impact on marine biodiversity beyond areas of national jurisdiction can be found, in particular, in the marine living resources sector (see paras. 48-60 above).[161] Of particular note are the adoption by the General Assembly of resolution 61/105, which addresses, inter alia, the impacts of bottom fishing on vulnerable marine ecosystems; the adoption by FAO of the International Guidelines for the Management of Deep-sea Fisheries in the High Seas; and the adoption by the ninth meeting of the Conference of the Parties to the Convention on the Conservation of Migratory Species of Wild Animals of a request to its member States to mitigate the effect of by-catch on migratory species and to assess the best practices available to do so (see paras. 36-58 and 61 above).

122. Highlighting one of the difficulties that can be encountered in implementing an ecosystem approach, IWC indicated that its management procedures, while taking environmental factors into account in a precautionary manner, are essentially single-species (population) approaches, which makes developing suitable models and obtaining the requisite data for true multispecies management quite difficult.

123. At the regional level, a number of regional fisheries management organizations, including the Commission for the Conservation of Antarctic Marine Living Resources, the Commission for the Conservation of Southern Bluefin Tuna, ICCAT, the Indian Ocean Tuna Commission, the Northwest Atlantic Fisheries Organization and NEAFC, have amended their instruments or reviewed their performance and management approaches to further incorporate an ecosystem approach to fisheries management (see also A/64/305).[162] NEAFC, in its contribution, highlighted the amendments adopted in 2006 to the North-East Atlantic Fisheries Convention, which now includes the objectives of ensuring the long-term conservation and optimum utilization of the fishery resources in the Convention area, providing sustainable economic, environmental and social benefits and protecting biodiversity (article 4).[163]

124. Also at the regional level, a partnership has been developed that links the UNEP Regional Seas Programme with the large marine ecosystem approach.[164] In

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[160] Project Hermes, "Promoting an ecosystem approach to the sustainable use and governance of deep-water resources", *Oceanography*, vol. 22(1), 2009.

[161] See also A/64/66, paras. 141-150.

[162] See A/63/128, paras. 131-134.

[163] See also A/64/66, paras. 141-150.

[164] The large marine ecosystem approach provides a framework for utilizing ecologically defined large marine ecosystems as place-based areas around the globe, to focus the methods of marine science, policy, law, economics and governance on a common strategy for assessing, managing, recovering and sustaining marine resources and their environments. Large marine ecosystems can be considered as units for facilitating integration across sectors, developing adaptive management frameworks with site-specific targets and providing tools for engaging stakeholders.

this context, several organizations are collaborating for the implementation of an ecosystem approach to manage marine and coastal resources including UNEP, through its project on addressing land-based activities in the Western Indian Ocean in the framework of the Nairobi Convention; the World Bank, through the south-west Indian Ocean fisheries project; and UNDP, through the Agulhas and Somali Current Large Marine Ecosystems Project.[165] Since the physical extent of the large marine ecosystem and its boundaries are based on ecological rather than political or economic criteria, such systems can extend beyond areas of national jurisdiction.

125. UNEP reported that it was developing an organization-wide implementation strategy for future marine and coastal work. The strategy is focused on applying an ecosystem approach as a means of enhancing human well-being and ensuring equitable access to ecosystem services. The strategy supports, inter alia, the development of common tools, guidelines and frameworks for defining and valuing selected marine and coastal habitats and their ecosystem services, and supporting the development of national policies for addressing environmental aspects of the use of marine resources. It also supports the collection, integration and synthesis of information on the status and trends of marine and coastal ecosystems under the regular process (see para. 22 above), as well as education and awareness-raising on the role of marine and coastal ecosystem services for human well-being (see also para. 176 below).[166]

126. UNEP is also developing a project proposal to support the ongoing international deliberations and efforts of Governments and stakeholders regarding the conservation and sustainable use of marine biodiversity in the high seas. The objective of the project is to enhance the knowledge, awareness, protection and sustainable use of high seas biodiversity by Governments and other stakeholders through cooperation and improved governance and management practices. Specific objectives of the project are (a) to promote integrated and policy-relevant interdisciplinary research and scientific assessment of the high seas, including valuation of the resources and ecosystem services, and establishing or strengthening networks for the participation of developing countries and small island developing States in such assessments and research; (b) to enhance the capacity of officials and researchers from developing countries and small island developing States (see para. 176 below); (c) to enhance cooperation within the United Nations and among the parties to relevant multilateral environmental agreements; and (d) to support the development and use of modern ocean governance and management tools (principles, guidelines, codes of conduct) by countries and other stakeholders, for example in the identification, establishment and implementation of high seas protected areas.[167]

127. Recent work in the field of valuation of ecosystem services, as a tool for the implementation of an ecosystem approach shows assigning value to ecosystem goods and services, which are the benefits human populations derive, directly or indirectly, from ecosystem functions, can be used as a means to demonstrate the importance of biodiversity for human well-being and to trigger political action to

[165] See www.unep.org/NairobiConvention/The_Convention/index.asp. See also UNEP "The UNEP large marine ecosystem Report: a perspective on changing conditions in LMEs of the World's Regional Seas", UNEP Regional Seas Report and Studies No. 182, 2007.

[166] Contribution of UNEP.

[167] Ibid.

address biodiversity loss. The valuation of ecosystems and the goods and services they provide, in particular those goods and services that are not traded in markets, is a key question for the conservation and management of biodiversity and ecosystems.[168] Highlighting the economic value of benthic resources is fundamental for improved management and conservation of these relatively unknown ecosystems. Failure to assess the values of ecosystems, quantitatively or qualitatively, could result in their being assumed to have zero value and not factored in decision-making processes.[169]

(b) Environmental impact assessments

128. At the 2008 meeting of the Working Group, several delegations addressed the possible use of environmental impact assessments beyond areas of national jurisdiction. Some delegations noted that provisions in international instruments that provide for environmental impact assessments should be fully implemented, and that regional and sectoral approaches to assessments should be supported.[170]

129. Environmental impact assessments are a procedure for evaluating the likely impacts of proposed activities on the environment,[171] considering natural, social and economic aspects. The purpose is to ensure that decision makers take those impacts into account in deciding whether to proceed with a project. The concept of strategic environmental assessment has also been developed as a tool for including environmental considerations in policies, plans and programmes at the earliest stages of decision-making. Strategic environmental assessment extends the application of environmental impact assessments from projects to policies, programmes and plans,[172] and hence is considered a key tool for sustainable development.[173]

130. A number of instruments with application beyond areas of national jurisdiction require that environmental impact assessments be done before a particular activity can take place. In particular, the United Nations Convention on the Law of the Sea requires that States parties monitor the risks or effects of pollution of the marine environment by observing, measuring, evaluating and analysing them by recognized scientific methods. In particular, States parties are required to keep under surveillance the effects of any activities which they permit or in which they engage in order to determine whether they are likely to pollute the marine environment (article 204). States parties are required to publish reports of the results obtained or provide such reports at appropriate intervals to the competent international

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[168] See notes 56 and 160 above. See also H. Naber et al., "Valuation of marine ecosystem services: a gap analysis", available at www.cbd.int/marine/voluntary-reports/vr-mc-wb-en.pdf.

[169] Project Hermes, note 160 above.

[170] See A/63/79, paras. 17 and 18.

[171] See the 1991 Convention on Environmental Impact Assessment in a Transboundary Context.

[172] World Bank, "Strategic environmental assessment: concept and practice", World Bank Environmental Strategy Note No. 14, 2005.

[173] Decision VI/7 of the Conference of the Parties to the Convention on Biological Diversity describes strategic environmental assessment as the formalized, systematic and comprehensive process of identifying and evaluating the environmental consequences of proposed policies, plans or programmes to ensure that they are fully included and appropriately addressed at the earliest possible stage of decision-making on a par with economic and social considerations, while the environmental impact assessment is a process of evaluating the likely environmental impacts of a proposed project or development.

organizations, which should make them available to all States (article 205). Furthermore, when States parties have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of, or significant and harmful changes to, the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and communicate reports of the results of such assessments in the manner provided in article 205 (article 206).

131. Principle 17 of the Rio Declaration on Environment and Development states that environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority. Other instruments that call for the use of environmental impact assessments include the Convention on Biological Diversity (art. 14);[174] the London Protocol (art. 14); the ISA Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area (ISBA/6/A/18, annex, regulation 18 (b); annex 2, para. 24 (b); and annex 4, para. 5.5 (a)); and the 1995 Fish Stocks Agreement (art. 6). At the regional level, examples of relevant instruments include the Protocol on Environmental Protection to the Antarctic Treaty (arts. 6 and 8); and the Barcelona Convention (art. 4). Goals and principles of environmental impact assessment were also adopted by UNEP in 1987.[175]

132. The General Assembly has promoted the use of environmental impact assessments with respect to the impacts of fishing on vulnerable marine ecosystems, by requesting States and regional fisheries management organizations to assess the impacts of bottom fishing activities and to ensure that, if these activities would have significant adverse impacts, they are managed to prevent such impacts or not authorized to proceed (see also para. 56 above).[176] The FAO International Guidelines for the Management of Deep-sea Fisheries in the High Seas (see paras. 57 and 58 above) call for environmental impact assessments to be carried out to establish if deep-sea fishing activities are likely to produce significant adverse impacts in a given area.[177]

133. At its ninth meeting, the Conference of the Parties to the Convention on Biological Diversity invited the parties, other Governments and relevant organizations, including in the context of the General Assembly Working Group, to cooperate in further developing scientific and technical guidance for the implementation of environmental impact assessments and strategic environmental assessments for activities and processes under their jurisdiction and control which may have significant adverse impacts on marine biodiversity beyond areas of national jurisdiction, taking into consideration the work of FAO, IMO and other relevant organizations, with a view to ensuring that such activities are regulated in such a way that they do not compromise ecosystem integrity.[178] In the same decision, the Conference of the Parties noted the need for capacity-building for developing countries in order to fully implement existing provisions of

[174] In decision VIII/28, the Conference of the Parties adopted voluntary guidelines on biodiversity-inclusive environmental impact assessment.

[175] Governing Council decision 14/25 of 17 June 1987. See also UNEP/GC.14/17, annex.

[176] See resolution 61/105, paras. 83-86. See also A/63/63, paras. 255 and 256.

[177] FAO, note 69 above.

[178] Decision IX/20.

environmental impact assessments, as well as the challenges and difficulties in carrying out assessments beyond areas of national jurisdiction. Taking into account the relevant provisions of the United Nations Convention on the Law of the Sea and the Convention on Biological Diversity, the Conference of the Parties decided to convene an expert workshop to discuss scientific and technical aspects of environmental impact assessments beyond areas of national jurisdiction with a view to contributing to the development of relevant scientific and technical guidance, building on ongoing sectoral, regional and national efforts. The expert workshop will be held in Manila in November 2009.[179]

(c) Area-based management tools

134. Area-based management, including the establishment of marine protected areas, has been recognized as an important tool for the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction. Previous reports of the Secretary-General provide extensive information on this subject (see in particular A/62/66/Add.2, paras. 122-161).

135. At the 2008 meeting of the Working Group, area-based management tools were recognized as essential and effective tools in the conservation and sustainable use of marine biological diversity, including beyond areas of national jurisdiction. Several delegations highlighted the importance of the tools, including marine protected areas, in the implementation of ecosystem and precautionary approaches to the management of human activities in the oceans and in addressing threats to marine ecosystems in a holistic and comprehensive manner. It was emphasized, however, that marine protected areas were only one of the several available tools and needed to be consistent with international law, as reflected in the United Nations Convention on the Law of the Sea.[180]

136. In the Manado Ocean Declaration, States participating in the 2009 World Oceans Conference resolved to further establish and effectively manage marine protected areas, including representative resilient networks, in accordance with international law, as reflected in the Convention and on the basis of the best available science, recognizing the importance of their contribution to ecosystem goods and services, and to contribute to the effort to conserve biodiversity and sustainable livelihoods and to adapt to climate change.[181]

137. By its decision IX/20, the Conference of the Parties to the Convention on Biological Diversity adopted scientific criteria for identifying ecologically or biologically significant marine areas in need of protection, as well as the scientific guidance for designing representative networks of marine protected areas (contained in annexes I and II to the decision), and took note of the four initial steps to be considered in the development of representative networks of marine protected areas (contained in annex III). The Conference of the Parties requested the Executive Secretary to transmit the information contained in those annexes to relevant General Assembly processes.[182]

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[179] Contribution of the secretariat of the Convention on Biological Diversity.

[180] A/63/79, para. 26.

[181] See www.woc2009.org/.

[182] See also A/63/63/Add.1, paras. 133-135.

138. In the same decision, the Conference of the Parties urged the parties and invited other Governments and relevant organizations to apply, as appropriate, the scientific criteria (annex I), the scientific guidance (annex II) and initial steps (annex III) to identify ecologically or biologically significant or vulnerable marine areas in need of protection, with a view to assisting the relevant processes within the General Assembly and implementing conservation and management measures, including the establishment of representative networks of marine protected areas in accordance with international law, including the United Nations Convention on the Law of the Sea.

139. The Conference of the Parties further decided to convene an expert workshop, using the best information available at the time, to provide scientific and technical guidance on the use and further development of biogeographic classification systems and guidance on the identification of areas in need of protection. The workshop will review and synthesize progress on the identification of areas beyond national jurisdiction which meet the scientific criteria and experience with the use of the biogeographic classification system, building upon a compilation of existing sectoral, regional and national efforts. The outcome of the workshop will be presented to and further considered by relevant meetings of the Conference of the Parties, with the aim of assisting the General Assembly. Pursuant to the decision, the workshop, to be held in Ottawa from 29 September to 2 October 2009, will only provide scientific and technical information and guidance.

140. A number of organizations are supporting the work of the secretariat of the Convention on Biological Diversity in this regard. For example, UNEP-WCMC is working with IUCN, the Marine Conservation Biology Institute and Duke University, in collaboration with the secretariat and other relevant partners, to provide scientific input relevant to the identification of ecologically or biologically significant marine areas beyond national jurisdiction. UNEP-WCMC is also leading the development and analysis of an Antarctic regional case study that will illustrate how these scientific criteria could be applied collectively and mapped in one area of the oceans. An expert workshop was held in March 2009 at UNEP-WCMC in order to explore the nature of gaps in knowledge and the use of proxies to identify significant areas in a scientifically informed manner utilizing the best available data. Once this identification stage has been completed, subsequent issues regarding prioritization, policy, implementation and management will be addressed. Results of the Antarctic regional case study will be presented at the Ottawa workshop (see para. 139 above).[183]

141. IOC reported that it had contributed to the development of the Convention on Biological Diversity criteria for identifying ecologically or biologically significant marine areas in need of protection, in particular through the publication of the global open oceans and deep seabed biogeographic classification.[184] This biogeographic classification provides a planning tool to assimilate multiple layers of information and extrapolation of existing data into large "bioregions" or provinces. The report notes that biogeographic classification is an important tool for understanding the distribution of species and habitats for the purposes of scientific research, conservation and management. It is therefore of importance to policymaking when considering the scales for ecosystem-based management and in

[183] Contribution of UNEP.

[184] IOC, note 40 above.

identifying areas representative of major ecosystems, which encompass both areas within and beyond national jurisdiction. Scientifically, this biogeographic classification can provide a basis for hypotheses and further scientific studies on the origin and evolution of deep sea faunal assemblages and the linkages between species communities and open ocean and deep seabed environments. Such a classification is a necessary component when considering area-based management options, such as marine protected areas, particularly when assessing the representativity of a potential network.

142. In June 2009, the Council of ISA noted that the establishment of a network of areas of particular environmental interest in the Clarion-Clipperton Fracture Zone could contribute in a number of important ways to the general objectives of the environmental regime created by ISA. The scientific information that could be generated by such areas would be useful for the adoption of rules, regulations and procedures incorporating applicable standards for the protection and preservation of the marine environment. The Council also endorsed the convening by ISA of a workshop to review further the proposal for the establishment of the network and advise on the formulation of an environmental management plan for the Clarion-Clipperton Fracture Zone.[185]

143. IMO reported that it had advised several regional bodies, including the Commission for the Protection of the Marine Environment of the North-East Atlantic and the secretariat of the Barcelona Convention, on timelines, procedures, data needs and potential pitfalls of designating protected areas on the high seas without IMO engagement.[186] IMO also reported on a range of instruments, recommendations and guidelines that provide a basis for area-based management of ships engaged in international voyages with a view to controlling and preventing pollution from ships, including MARPOL and the Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas set out in Assembly resolution A.982(24).[187]

144. IWC reported that it was working towards the development of conservation plans including the role of marine protected areas as management tools in such plans.

145. At the regional level, EEA is developing a standard comprehensive habitat classification, in collaboration with the relevant regional seas conventions, which may help in identifying conservation targets in the marine environment, including beyond areas of national jurisdiction.[188]

146. The Commission for the Protection of the Marine Environment of the North-East Atlantic reported on its work towards the establishment of a network of marine protected areas in the north-east Atlantic in areas beyond national jurisdiction. Action to this end includes agreement on conservation objectives for the area proposed for the Charlie Gibbs Fracture Zone by the Working Group on Marine Protected Areas Species and Habitats; consideration by jurists and linguists of the Commission for the Protection of the Marine Environment of the North-East

[185] ISBA/15/C/5. See also ISBA/15/C/8.

[186] Contribution of IMO.

[187] Ibid. For example, a special area under annex V to MARPOL in the Mediterranean Sea area came into effect on 1 May 2009. See also A/62/66/Add.2, paras. 153-155.

[188] See http://eunis.eea.europa.eu/habitats.jsp.

Atlantic of the legal implications of designating marine protected areas, including the mandate of the Commission to designate such areas and presentation of formal advice to the Commission;[189] consultations on the Charlie Gibbs Fracture Zone proforma nomination with all relevant competent authorities, including NEAFC, ISA and IMO; further development of a suite of seven additional marine protected areas, including other sections of the Mid-Atlantic Ridge and seamount complexes, which received support at the technical scientific level by the Commission's Biodiversity Committee and Working Group on Marine Protected Areas, Species and Habitats and will be considered by the Commission; and agreement by the Contracting Parties that, within the next six to nine months, the Commission should make arrangements to consider management measures for marine protected areas beyond areas of national jurisdiction, compliance and enforcement mechanisms for such areas, and wider involvement of, and communication with, relevant stakeholders. The Commission also reported that there was a close correlation between some additional sites and fisheries closures considered favourably by NEAFC, and both the Commission and NEAFC had acknowledged that, in order to protect biodiversity beyond areas of national jurisdiction, such sites should be extensive.[190]

147. The secretariat of the Barcelona Convention is launching an initiative aimed at promoting the establishment of a representative ecological network of marine protected areas in the Mediterranean. The steering committee on the identification of possible specially protected areas of Mediterranean importance in Mediterranean areas beyond national jurisdiction met in March 2009.[191] A shortlist of potential Mediterranean high seas sites to be declared as specially protected areas will be presented for consideration by the Contracting Parties to the Barcelona Convention.[192]

148. Information on the activities of regional fisheries management organizations in relation to area-based management is included in the report of the Secretary-General on action taken to address the impacts of bottom-fishing activities on vulnerable marine ecosystems (A/64/305).

149. FFA indicated, in its contribution, that its secretariat was in the process of undertaking a preliminary analysis of the implications of the closure of the two remaining high seas pockets in the Pacific Islands region. The analysis will cover scientific, environmental, legal and fisheries compliance implications of the closure to FFA members.

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[189] The 2009 meeting of the Commission was held from 22 to 26 June 2009.

[190] Contribution of the Commission for the Protection of the Marine Environment of the North-East Atlantic.

[191] The Steering Committee is composed of: UNEP Regional Seas Programme, Mediterranean Action Plan, European Community, FAO, IMO, Commission for the Protection of the Marine Environment of the North-East Atlantic, Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea, secretariat of the Agreement on the Conservation of Cetaceans of the Black Sea Mediterranean Sea and Contiguous Atlantic Area, Pelagos Sanctuary, General Fisheries Commission for the Mediterranean, Mediterranean Science Commission and World Wide Fund for Nature.

[192] See UNEP (DEPI)/MED WG.331/Inf. 7.

2. Governance

150. The need to improve governance has been at the heart of efforts to enhance the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction. Although to date there is no consensus on some of the legal and policy issues relating to governance of marine biodiversity beyond areas of national jurisdiction, many different options are being elaborated and discussed.[193]

151. Governance issues have been discussed by the Working Group since its inception.[194] The Working Group has noted in this context that the United Nations Convention on the Law of the Sea sets out the legal framework within which all activities in the oceans and seas must be carried out, and that a number of other conventions and instruments complement the Convention and, together with it, provide the legal framework for activities relating to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction.[195] At its 2008 meeting the Working Group discussed whether there was a governance or regulatory gap, and if so how it should be addressed.[196]

152. As indicated in the preceding sections, a number of recent international instruments have been developed or are under development, which are relevant to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction and are aimed at facilitating and providing practical guidance on the implementation of existing instruments.

153. The importance of increasing participation in such instruments has been emphasized in various forums, including the General Assembly and the Working Group.[197] As at 15 August 2009, there were 159 parties to the United Nations Convention on the Law of the Sea. The number of parties to the Part XI Agreement[198] has increased to 137 parties.

154. In the context of fisheries, the 1995 Fish Stocks Agreement[199] has been described as the most important multilateral legally binding instrument for the conservation and management of high seas fisheries since the adoption of the United Nations Convention on the Law of the Sea.[200] However, its full potential cannot be achieved until all States become parties to it and fully comply with their obligations to cooperate under international law. The number of parties to the Agreement has recently increased to 75, with 18 States becoming parties since the first session of the Review Conference in 2006. The eighth round of informal consultations of States Parties to the United Nations Fish Stocks Agreement, held in March 2009, included a continuing dialogue to promote a wider participation in the United Nations Fish Stocks Agreement (also see para. 179 below). During the dialogue, a number of participants emphasized that there must be real and practical advantages for developing States to participate in the Agreement, particularly through exploitation of fishery resources in areas under national jurisdiction and on the high

[193] Contribution of ADB.

[194] For example, see A/61/65, paras. 22-31, 50-52 and 54-62; and A/63/79, paras. 40-48.

[195] A/63/79, para. 9.

[196] A/63/79, paras. 40-48.

[197] See, for example, resolution 63/111, paras. 3, 4, 53, 101 and 108 and resolution 63/112, paras. 5, 18, 84, 85 and 118.

[198] United Nations, *Treaty Series*, vol. 1836, No. 31364.

[199] Ibid., vol. 2167, No. 37924.

[200] A/63/128, para. 11.

seas. Capacity-building to enhance fishing fleets and the need for developing States to participate on an equal footing in high seas fisheries regulated by regional fisheries management organizations and arrangements were emphasized.[201]

155. The importance of increasing participation in the constitutive instruments of regional fisheries management organizations and arrangements has also been highlighted, including in the context of addressing the impacts of bottom fishing on vulnerable marine ecosystems.[202] At its ninth meeting, the Conference of the Parties to the Convention on the Conservation of Migartory Species of Wild Animals urged parties to participate in regional fisheries management organizations and other relevant forums in order to reduce the impact of by-catch on threatened migratory species (see para. 61 above).[203]

156. FFA reported that its members were engaged in negotiations to establish the South Pacific regional fisheries management organization, which would focus on non-highly migratory fish and complement the Western and Central Pacific Fisheries Commission. Its members would ensure that appropriate provisions were included in relation to the Pacific Islands region, given the presence of high seas enclaves wholly surrounded by exclusive economic zones.[204] The seventh international meeting on the establishment of the organization was held in Lima from 18 to 22 May 2009 and most of the provisions of the draft convention were provisionally agreed. The negotiations are expected to conclude at the eighth meeting, to be held in New Zealand in November 2009 (see A/64/305).[205]

157. In addition, the General Assembly has highlighted the importance of participation in international instruments relating to pollution from ships and maritime safety and other instruments aimed at the protection and preservation of the marine environment. In particular, the General Assembly has recently encouraged States to become parties to the Protocol of 1997 (Annex VI-Regulations for the Prevention of Air Pollution from Ships) to MARPOL, and to ratify or accede to the International Convention for the Control and Management of Ships' Ballast Water and Sediments.[206]

158. At the 2008 meeting of the Working Group, delegations generally recognized that there were implementation gaps in the international legal framework and emphasized the need for full and effective implementation of existing instruments, including available principles and tools.[207] Several delegations also emphasized that capacity-building and technology transfer were at the centre of efforts to address implementation gaps, and encouraged the strengthening of capacity-building activities (see paras. 172 and 205 below).[208]

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[201] Report of the eighth round of informal consultations of States Parties to the United Nations Fish Stocks Agreement, ICSP8/UNFSA/REP/INF.6, annex II.

[202] See, for example, A/63/79, para. 45 and resolution 63/112, paras. 26, 77, 83, 87 and 106.

[203] Contribution of the secretariat of the Convention on the Conservation of Migartory Species of Wild Animals.

[204] Contribution of FFA.

[205] Report of the seventh international meeting on the establishment of the proposed South Pacific regional fisheries management organization, Lima, Peru, 18-22 May 2009.

[206] See, for example, A/62/66/Add.2, para. 283 and resolution 63/111, paras. 53, 101 and 108. For information on the status of IMO instruments, see www.imo.org/home.asp.

[207] A/63/79, para. 40.

[208] Ibid., para. 41.

159. Various efforts have been made to improve the effective implementation of existing international instruments relevant to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction, including available principles and tools, some of which are described above. The need for effective implementation of relevant conventions and the application of other instruments has been underlined in General Assembly resolutions and also, most recently, by the IUCN World Conservation Congress.[209] The Congress, which met in October 2008, adopted a number of resolutions relevant to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction and launched "Ten Principles for High Seas Governance".[210]

160. International cooperation and coordination are essential in efforts to improve governance in relation to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction. In this regard, concern has been expressed at the Working Group that the lack of coordination between and among the various sectoral actors has been a hindrance to effective governance of activities beyond areas of national jurisdiction, and it has been noted that current arrangements have tended to focus on assessing and mitigating the environmental impacts of specific activities rather than on the marine environment as a whole.[211]

161. A number of recent activities to enhance international cooperation and coordination, and thereby to improve governance in relation to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction, are described below.

162. FAO has been promoting multisectoral partnerships on fisheries management and conservation beyond areas of national jurisdiction, including with the secretariat of the Convention on Biological Diversity, IUCN, the Deep Sea Conservation Coalition and the Census of Marine Life. FAO also reported that efforts had been undertaken to share information on activities in relation to management of human activities and conservation in the high seas, including between the Convention on Biological Diversity, FAO, IMO and ISA.[212] The FAO Committee on Fisheries has also recommended that FAO continue to provide technical advice to the secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora in relation to listing proposals for commercially exploited aquatic species, and agreed that FAO should continue to provide technical input to the fisheries subsidies negotiations in the World Trade Organization.[213] Through global partnerships, such as the Global Programme on Fisheries, the World Bank has cooperated with a

[209] Contribution of IUCN. See resolution 4.031, "Achieving conservation of marine biodiversity in areas beyond national jurisdictions".

[210] Contribution of IUCN. See in particular resolution 4.031, "Achieving conservation of marine biodiversity in areas beyond national jurisdictions" and Resolution 4.045, "Accelerating progress to establish marine protected areas and creating marine protected area networks". The 10 principles include the following: conditional freedom of activity on the high seas; protection and preservation of the marine environment; international cooperation; science-based approach to management; public availability of information; transparent and open decision-making processes; precautionary approach; ecosystem approach; sustainable and equitable use; and responsibility of States as stewards of the global marine environment.

[211] A/63/79, para. 21.

[212] Contribution of FAO.

[213] FAO, note 72 above.

number of regional fisheries bodies tasked with governance of fisheries beyond areas of national jurisdiction.[214]

163. NEAFC reported that it had entered into a number of arrangements with other forums that monitor and regulate human activities in the marine environment, including the International Council for the Exploration of the Sea, IMO and the Commission for the Protection of the Marine Environment of the North-East Atlantic. With regard to cooperation among regional fisheries management organizations, the second joint meeting of the five tuna organizations was held from 29 June to 3 July 2009 and adopted, inter alia, a workplan for 2009-2011. The meeting also decided to address issues at a global level where the work of the individual organizations was not sufficient.[215]

164. Some regional fisheries management organizations have taken action to coordinate activities to combat illegal, unreported and unregulated fishing (see para. 55 above).[216] NPAFC highlighted the cooperative enforcement efforts of its members to combat high seas driftnet fishing for salmon, including the conclusion of a joint enforcement plan, initiatives to share information and best practices and programmes of cooperation with the Western and Central Pacific Fisheries Commission and the North Pacific Coast Guard Forum.[217]

165. Regarding current threats to some populations of whales and other cetaceans from by-catch in fisheries and ship strikes, IWC continued to cooperate with other bodies, such as FAO and the secretariat of the Convention on the Conservation of Migratory Species of Wild Animals, the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas and the Agreement on the Conservation of Cetaceans of the Black Sea Mediterranean Sea and Contiguous Atlantic Area and more recently, in relation to ship strikes, with IMO with whom a formal agreement of cooperation was being finalized. The Scientific Committee had also been collaborating with FAO on collation of relevant fisheries and by-catch data with the aim of identifying fisheries where further monitoring would be valuable.[218] IWC had also joined the IMO initiative aimed at minimizing the incidental introduction of noise from commercial shipping to reduce potential adverse impacts on marine life (also see para. 96 above). Also, the Commission for the Protection of the Marine Environment of the North-East Atlantic is participating in work under the Agreement on the Conservation of Cetaceans of the Black Sea Mediterranean Sea and Contiguous Atlantic Area to develop appropriate tools to assess the impact of anthropogenic noise on cetaceans and to further elaborate measures to mitigate such impacts.[219]

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[214] Contribution of the World Bank.

[215] Draft report of the second joint meeting of tuna regional fisheries management organizations, San Sebastian, Spain, 29 June-3 July 2009, available at www.tuna-org.org/trfmo2.htm.

[216] For example, see A/63/128, paras. 95 and 138.

[217] Contribution of NPAFC. From 1993 to 2008, the cooperative enforcement efforts resulted in the detection of 41 vessels conducting directed driftnet fishing operations for salmon in the Convention Area, of which 16 vessels were apprehended.

[218] Contribution of IWC.

[219] See A/63/63, para. 300 and summary record of the 2008 meeting of the Working Group on the Environmental Impact of Human Activities, document EIHA 08/8/1-E of the Commission for the Protection of the Marine Environment of the North-East Atlantic, para. 3.7.

166. IWC also reported that, while it had no regulatory powers to control other potential threats to whales in sanctuaries[220] (e.g. shipping, fishing activities, oil and gas exploration and exploitation), such issues should nonetheless be addressed through cooperation with other relevant organizations or by voluntary actions of IWC member countries. Some member countries consider that whale stocks should be managed on a stock-by-stock basis rather than by establishing sanctuaries.[221]

167. The secretariat of the Convention on the Conservation of Migratory Species of Wild Animals reported that it collaborated closely with a large number and range of other multilateral environmental agreements, and intergovernmental and non-governmental organizations, and that it had formed formal partnerships with a number of organizations in regard to the conservation of marine biodiversity (also see paras. 61 and 65 above).[222]

168. In the context of pollution, joint concentrated inspection campaigns have been held between the regional agreements on port State control to increase the efficient use of resources and information with respect to IMO instruments.[223]

169. As indicated in paragraph 143 above, IMO has advised the secretariat of the Barcelona Convention and the Commission for the Protection of the Marine Environment of the North-East Atlantic.[224] The Commission, apart from its collaboration with the Barcelona Convention, IMO, ISA and NEAFC (see para. 146 above), plans to cooperate with and support the work of several bodies in relation to biodiversity beyond areas of national jurisdiction, including workshops by the secretariat of the Convention on Biological Diversity to consider the application of biodiversity criteria and environmental impact assessments; strategic approaches being suggested by IUCN; efforts by the Arctic Council to better understand the impacts of climate change; and efforts by the Global Forum on Oceans, Coasts and Islands to raise awareness of the linkages between oceans and climate change.[225]

170. The Division for Ocean Affairs and the Law of the Sea of the Secretariat has collaborated with a number of organizations on issues of relevance to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction. For example, it participated in the meetings of those organizations and provided advice on issues pertaining to the United Nations Convention on the Law of the Sea and the 1995 Fish Stocks Agreement. The Division also collaborates in the preparation of documents and studies. Recent examples include cooperation with the secretariats of the Convention on Biological Diversity, and the Convention on International Trade in Endangered Species of Wild Fauna and Flora, FAO, IOC and UNEP. The Division has also partnered with UNEP to deliver a training workshop on ecosystem approaches (see para. 174 below).

171. At its seventh meeting, in April 2009, UN-Oceans received a report of activities of its task force on biodiversity in areas beyond national jurisdiction, in particular its work on the compilation of tools provided for under relevant international instruments for the

[220] For information on the IWC sanctuaries in the Indian Ocean and the Southern Ocean, see A/62/66/Add.2, para. 152.

[221] Contribution of IWC.

[222] Contribution of the secretariat of the Convention.

[223] See, for example, A/63/63, para. 195.

[224] Contribution of IMO.

[225] Contribution of the Commission for the Protection of the Marine Environment of the North-East Atlantic.

conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction, and the ways to strengthen existing mechanisms of cooperation and coordination among intergovernmental organizations and bodies. The Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, United Nations, which is one of the co-leaders of the task force, has developed a web page addressing the issue of marine biodiversity beyond areas of national jurisdiction.[226]

3. Capacity-building

172. In recognition of its cross-cutting character and relevance to all issues relating to oceans and the law of the sea, the General Assembly has continuously emphasized the need to build capacity for the implementation of relevant international instruments, including those relating to the conservation and sustainable use of marine biodiversity. At its 2006 and 2008 meetings, the Working Group stressed the need for increased efforts aimed at improving the capacity of developing States, particularly the capacity to participate in marine scientific research and benefit from its results; the capacity to implement relevant legal instruments and enforce their provisions; and the capacity to mitigate and adapt to the impacts of a number of anthropogenic activities, including climate change.[227] The importance of cooperation among States and among regional and global organizations to promote capacity-building was also highlighted, including at meetings of the Consultative Process.[228]

173. Past reports of the Secretary-General have provided an overview of capacity-building activities related to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction.[229] Recent developments are presented below.

174. In light of the recognition that the application of an ecosystem approach will require, inter alia, capacity-building in developing countries, including small island developing States and coastal African States,[230] the Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, United Nations has developed and validated training manuals on developing and implementing ecosystem approaches to the management of ocean-related activities and on the development, implementation and management of marine protected areas.[231] While focusing on areas within national jurisdiction, the manuals and associated training courses provide information and aim at building skills and knowledge that is also of relevance to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction.

175. With regard to marine scientific research, and as part of its mandate to assist States in the uniform and consistent application of the provisions of the United Nations Convention on the Law of the Sea, including through the preparation of publications on oceans and the law of the sea, the Division convened a group of experts on marine scientific research in April 2009 to review its 1991 publication entitled "Marine

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[226] See www.un.org/Depts/los/biodiversityworkinggroup/marine_biodiversity.htm.

[227] See A/61/65, paras. 20 and 68-70 and A/63/79, para. 11.

[228] See A/64/66, section I.

[229] See A/60/63/Add.1, paras. 302 and 308 and A/62/66/Add.2, paras. 243-248.

[230] A/61/156, para. 8 (a).

[231] A/64/66, para. 162.

scientific research: a guide to the implementation of the relevant provisions of the United Nations Convention on the Law of the Sea".[232]

176. UNEP reported that its project proposal (see para. 126 above) was expected to enhance the capacity of officials and researchers from developing countries and small island developing States to participate in relevant research and to benefit from its results. It would also strengthen their ability to participate actively and negotiate in international processes and to implement, comply with and enforce relevant international obligations and develop legal instruments at the national and regional levels. The UNEP strategy (see para. 125 above) is also expected to support, inter alia, the strengthening of the capacity of developing countries, including small island developing States, to engage in international processes to identify vulnerable ecosystems and biodiversity beyond areas of national jurisdiction, to develop frameworks for improving their governance and management and to effectively comply with reporting requirements under multilateral environmental agreements.[233]

177. In its decision IX/20, the Conference of the Parties to the Convention on Biological Diversity noted the need for capacity-building to enable developing countries to fully implement existing provisions of environmental impact assessments, and to meet the challenges of carrying out environmental impact assessments beyond areas of national jurisdiction.[234]

178. As the financial mechanism of the Convention on Biological Diversity, GEF supports institutional capacity-building and the development of the appropriate policy frameworks to ensure sustainable biodiversity conservation, including marine biodiversity.[235] In the context of the GEF International Waters Programme, five projects for areas beyond national jurisdiction have been submitted to date.[236]

179. The special requirements of developing States for participation in, and the implementation of, the legal and policy framework for sustainable fisheries have been recognized (see para. 154 above). A number of instruments provide for cooperation to enhance the ability of developing States to develop their own fisheries and to participate in and have access to high seas fisheries.[237] Notwithstanding these instruments, the ability of developing States to participate in high seas fisheries has been raised in a number of forums.[238]

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[232] See A/63/63/Add.1, para. 109.

[233] Contribution of UNEP.

[234] Contribution of the secretariat of the Convention on Biological Diversity.

[235] See also GEF website at www.gefweb.org.

[236] The Western and Central Pacific Oceanic Fisheries project (under way); the Agulhas and Somali Current Large Marine Ecosystems-UNDP project (under way); the Southern Indian Ocean Seamounts project (approved concept); the Southern Ocean Seabirds project (submitted); the Indian Ocean Deep-sea Fisheries project (submitted). See A. Duda, "Overview of the GEF, the replenishment process, and the international waters portfolio", presentation at the workshop on governance of marine areas beyond national jurisdiction: management issues and policy options, 3-5 November 2008, Singapore.

[237] Article 25 (1) of the 1995 Fish Stocks Agreement and article 5.2 of the FAO Code of Conduct.

[238] During the Review Conference held in May 2006, issues raised in this regard included the lack of means of developing States to join regional fisheries management organizations and implement their conservation and management measures, the need to increase the capacity of developing States, and perceived uneven allocation of fishing rights between developing and developed States. In this context, dissatisfaction was expressed by some concerning the determination of allocations on the basis of historical catches, as this favoured States with well-established industrial-sized fishing fleets and hampered the development of States with emerging fisheries. See A/CONF.216/2006/15, para. 80.

180. FAO has initiated a series of regional workshops and has partnered or cooperated with regional fisheries management organizations in the delivery of national workshops to develop national capacity and promote bilateral, subregional and regional coordination so that countries will be better placed to strengthen and harmonize port State measures and, as a result, implement the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing and the FAO Model Scheme and contribute to the development of a legally binding instrument on port State measures.[239]

181. FFA, in its contribution, observed that scientific information relating to Pacific island fisheries is obtained primarily from observer data and regional fisheries research, including work by the secretariat of the Pacific Community in conjunction with FFA members on tuna tagging. A greater understanding of fish stocks and other marine living resources beyond areas of national jurisdiction was needed. FFA members would welcome further assistance in that respect, and the sponsors of any marine scientific research planned beyond areas of national jurisdiction in the Pacific islands region should consider inviting the participation of adjacent coastal States' representatives.

182. The World Bank reported that several of its projects contributed to improving the capacity of developing countries to implement their responsibilities as flag States. Through global partnerships such as the Global Programme on Fisheries, it had provided some support to entities advocating responsible and precautionary use of marine living resources beyond areas of national jurisdiction and cooperated with a number of regional fisheries bodies tasked with governance of fisheries beyond areas of national jurisdiction.

III. Possible options and approaches to promote international cooperation and coordination

183. The conservation and sustainable use of marine biodiversity, including beyond areas of national jurisdiction, is a cross-cutting issue regulated and managed by numerous and often overlapping legal frameworks, organizations and bodies, at the national, regional and global levels. Cooperation among these organizations and bodies at all levels, as well as across sectors and regimes with varying competencies beyond areas of national jurisdiction, is the basis for a coordinated approach to the management of activities aimed at the conservation and sustainable use of such biodiversity.

184. At the 2008 meeting of the Working Group, many delegations highlighted international cooperation and coordination as critical for addressing the challenges relating to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction. This was particularly the case in light of the multiple threats thereto and the wide range of relevant global and regional instruments and international organizations and bodies with predominantly sectoral mandates.

[239] Contribution of FAO.

185. Some delegations recognized that the Working Group provided an important forum for facilitating cooperation and coordination among States, as well as within and between global and regional organizations.[240]

186. A number of options and approaches to improve cooperation and coordination with respect to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction have been discussed in various international forums, and several studies have been developed on these issues (see section IV below and the annex to the present report). This section outlines options and approaches which have been proposed to facilitate and promote international cooperation and coordination.

A. Cross-sectoral cooperation and coordination

187. At the 2008 meeting of the Working Group, it was recognized that greater cooperation and coordination was required among sectors and organizations addressing various uses of the oceans and their resources and the protection and preservation of the marine environment, in particular cooperation among regional fisheries management organizations and arrangements and between those organizations and non-fisheries organizations.[241] Some delegations expressed concern that the lack of coordination between and among the various sectoral actors was a hindrance to effective governance of activities in areas beyond national jurisdiction.[242] The importance of cooperation between relevant United Nations agencies, funds and programmes through UN-Oceans was noted.[243] Different views were expressed on ways and means to facilitate cooperation, including on whether new mechanisms were necessary.[244]

188. As outlined above, some degree of cross-sectoral cooperation has taken place (see paras. 162-171) and could be further expanded. UNEP, in its contribution, stated that a number of management regimes were relevant to high seas conservation, but substantial biodiversity conservation gaps still existed both within and outside those regimes. UNEP suggested that reform and expansion of regional fisheries management organizations was needed to build increased protective measures for high seas biodiversity in connection with destructive fishing practices. In its contribution, FFA noted that the appropriateness of existing fisheries management institutions addressing marine biodiversity beyond areas of national jurisdiction and whether their respective constituting instruments and mandates should be extended required further consideration. Issues related to the reform and expansion of regional fisheries management organizations have been raised at the 2008 meeting of the Working Group as well as at the Review Conference on the 1995 Fish Stocks Agreement and the General Assembly.[245]

189. As regards the role of UN-Oceans, it could be strengthened as a mechanism and platform for inter-agency coordination on marine biodiversity beyond areas of

[240] A/63/79, para. 23.
[241] Ibid., paras. 22 and 23.
[242] Ibid., paras. 21 and 22.
[243] Ibid., para. 24.
[244] Ibid., para. 25.
[245] Ibid., para. 40. See also A/CONF.210/2006/15, para. 21 and General Assembly resolution 63/112, para. 94.

national jurisdiction.[246] The assumption of that role would, however, require specific guidance and a mandate for action as well as support from the governing bodies of its members. In that regard, as also noted by UNEP,[247] a review of the roles, strengths and contributions of various organizations in respect of marine biodiversity beyond areas of national jurisdiction, in particular with a view to filling in possible gaps and avoiding duplication of work, could enhance cooperation and coordination.

190. Cooperation between all relevant organizations, both intergovernmental and non-governmental, at all levels and across sectors, could also be further encouraged and developed. For example, in the area of science, the participation of UNEP in the Hermes and Hermione projects (see paras. 20, 34 and 106 above) has demonstrated the benefits of close collaboration with deep-sea scientists and experts. It has, among other things, allowed for new research results and discoveries to be made available to decision makers and thereby enhanced the science-policy interface.[248] Other examples include the ISA partnership in the Kaplan project (see para. 18 above) and the work carried out by the Census of Marine Life (see para. 16). The cooperation between UNEP and IOC in the context of the "assessment of assessments" phase of the regular process (see paras. 12, 22, 23 and 206) is also noteworthy.

191. Improved dialogue between the scientific community and policymakers is vital to ensure that science responds to the policy needs regarding information and vice versa.

B. Cooperation and coordination to strengthen the information base

192. Collection and exchange of information is critical to promote the conservation and sustainable use of marine biodiversity.[249] This can be further facilitated by States, international organizations and other relevant actors, including those with a mandate broader than ocean affairs.

193. The 2008 meeting of the Working Group noted knowledge gaps and emphasized the essential role of science in underpinning further efforts in the conservation and sustainable use of marine biodiversity (see para. 12 above).[250] Broad support was expressed for further scientific research, particularly in areas still largely unexplored.[251] The urgent need to promote additional research and information-sharing on new and emerging activities was also underlined,[252] as was

[246] As also indicated by UNEP in its contribution.

[247] Contribution of UNEP.

[248] Ibid.

[249] As also noted by ECO in its contribution.

[250] A/63/79, paras. 10 and 19.

[251] Ibid., para. 10. See also the Valencia Declaration adopted by the World Conference on Marine Biodiversity, which urged that research efforts to explore and better understand marine biodiversity be enhanced and promoted to provide the knowledge base necessary to underpin an adaptive management process. The declaration is available at www.marbef.org/worldconference/index.php.

[252] A/63/79, para. 15.

the need to enhance the sharing of scientific information and results from marine genetic resources beyond areas of national jurisdiction (see also sect. IV below).[253]

194. Several delegations highlighted the need to foster scientific cooperation and multidisciplinary research efforts and partnerships with developing States.[254] Scientific cooperation was also considered a way to improve the capacity of developing States.[255] Some delegations referred to, among other things, the need for increased funding for research beyond areas of national jurisdiction and for coordinated scientific advice to provide existing regulatory bodies with a common scientific basis for decision-making (see para. 172 above).

195. Furthermore, it was pointed out that marine scientific research should be conducted in accordance with the United Nations Convention on the Law of the Sea and that the results of such research should be shared. In that respect, it was emphasized that scientific research activities should not cause damage to the marine environment and its resources, and that relevant intergovernmental organizations should cooperate to that end.[256]

196. *Filling in knowledge gaps*. UNEP recommended identifying and applying innovative funding mechanisms to address the significant amount of research yet to be undertaken on the high seas in order to fill the knowledge gaps in identifying key areas for the establishment of marine protected areas beyond areas of national jurisdiction (see paras. 134-149 above).[257]

197. The IOC report on biogeographic classification (see para. 141 above) notes that there is a need to encourage further international cooperative work in this domain, including in order to generate political support for international scientific cooperation at a global scale and adequate funding.[258]

198. In its contribution, IWC reported that internationally coordinated research was needed to address gaps in knowledge on sonar-related cetacean strandings by improving the ability to conduct necropsies as quickly as possible, standardizing data collection on the animal's environment at the time of death or stranding and coordinating with military or other government agencies so that all factors relating to the stranding are examined.

199. With regard to marine genetic resources, more information is needed on aspects such as the extent to which those resources are sampled, studied and used (see also para. 103 above). While scientific research is progressing (see para. 104), research related to the economic and socio-economic aspects of the conservation and use of marine genetic resources beyond areas of national jurisdiction appears comparatively limited. Such research is moreover constrained by the fact that some information is not readily available, such as modalities and terms of partnerships, by lack of information on the precise location of sampling or collection (see para. 106) and by economic aspects such as returns on investments. At the 2008 meeting of the Working Group, it was proposed that alliances among research groups be established for the analysis of the biological, human and economic potential of

[253] Ibid., para. 35.
[254] Ibid., para. 41.
[255] Ibid., para. 45.
[256] Ibid., para. 16.
[257] Contribution of UNEP.
[258] IOC, note 40 above.

marine genetic resources. The establishment of programmes to monitor the use of harvested resources was also proposed.[259]

200. *Management, access to and dissemination of information*. The management, access to and dissemination of data among various research programmes as well as between research and policymaking mechanisms is an issue requiring particular attention.

201. While a number of projects have been developed to disseminate information and data (see paras. 12-43 above), existing knowledge of high seas biodiversity remains uneven, patchy and not well coordinated or easily accessible. In that regard, the establishment or further development of global information systems or databases (see paras. 32-43) encompassing catalogues and inventories, information on technologies and results of technical, scientific and socio-economic research, or providing links to such information, may provide a useful tool. In order to strengthen the information base and dissemination, greater input from scientists, economists and industry would be beneficial, including through a multi-stakeholder network of experts.

202. UNEP suggested that existing data, maps and coverage of bioregionalizations, biogeographic features, species, habitats and geopolitical information related to high seas biodiversity should be consolidated into a centralized knowledge management system, building on existing agreements and tools such as the high seas interactive map (see para. 33 above). In that regard, UNEP recommended efforts to streamline and link existing knowledge systems, such as the databases of the Census of Marine Life, the Global Biodiversity Information Facility and the World Database on Protected Areas. It further suggested that the generation of new knowledge should be increasingly supported and made interoperable with other relevant databases and initiatives, where possible. UNEP recommended workshops to review available high seas data, reach agreement on parameters for consolidation into an accessible and interoperable system, identify knowledge gaps and help determine funding and research priorities. It also suggested increasing coordination and communication between smaller and broad-scale projects to ensure that data was standardized and more easily accessible to policymakers.

203. Greater cooperation and coordination among intergovernmental organizations would be beneficial to provide a multidisciplinary and consolidated set of data and information. Consideration could be given as to how the regular process (see paras. 12, 22, 23, 190 and 206 of the present report) could facilitate this process.

C. Cooperation and coordination in capacity-building and technology transfer

204. In its resolutions on oceans and the law of the sea, the General Assembly has consistently called upon donor agencies and international financial institutions to keep their programmes systematically under review to ensure the availability in all States, particularly in developing States, of the economic, legal, navigational, scientific and technical skills necessary for the full implementation of the United

[259] A/63/79, para. 34.

Nations Convention on the Law of the Sea, as well as the sustainable development of the oceans and seas nationally, regionally and globally.[260]

205. At the 2008 meeting of the Working Group, the need for increased capacity-building for developing States was highlighted. Efforts in that regard should aim at improving, inter alia, the capacity to participate in marine scientific research and benefit from its results (see para. 172 above); the capacity to implement legal instruments and enforce their provisions (see paras. 158 and 172); and the capacity to mitigate and adapt to the impacts of a number of anthropogenic activities. The need for the transfer of relevant technologies was highlighted by many delegations.[261] Several delegations also emphasized that cross-sectoral capacity-building and technology transfer should be primary aspects of cooperative efforts and highlighted their particular importance in the context of marine scientific research.[262] The need for capacity-building for developing countries to participate in and benefit from activities related to marine genetic resources beyond areas of national jurisdiction was stressed, as was the need to enhance the sharing of scientific information and results. In this regard, reference was made to the usefulness of the ISA Endowment Fund (see para. 17).[263]

206. In some regions the conduct of assessments is limited by the lack of capacity in some States to collect, analyse and interpret scientific, social and economic information. Therefore, in many cases, enhancing the capacity of States to conduct assessments will be an essential prerequisite to the effectiveness of the regular process (see paras. 12, 22, 23 and 190 above). In this regard, the regular process could catalyse better coordination of capacity-building initiatives.[264]

207. While several relevant capacity-building programmes and opportunities may be available in various countries and from various international organizations, information on those programmes is not necessarily easily found or even accessible to scientists and policymakers in developing States. Conversely, the specific capacity needs of States are not always well known to providers of assistance and the donor community, in particular in light of the varying degrees of advancement of countries in the marine sciences.[265] In order to improve access to information on available assistance and capacity needs as well as to ensure that offers of assistance match the demand, compilations and databases of available assistance and needs could be developed and disseminated through the relevant international organizations. Consideration could be given to the role of UN-Oceans, in particular its Task Force on Biodiversity Beyond Areas of National Jurisdiction, in that regard.

208. Greater participation of developing States' scientists in research programmes could also be facilitated, including through wider dissemination of participation opportunities. Given the costs of scientific research beyond areas of national

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[260] See, for example, resolution 63/111, para. 9. The need for capacity-building has also been raised at the Meetings of States Parties to the Convention. See, for example, SPLOS/164, para. 108 and SPLOS/184, para. 111.

[261] A/63/79, para. 11.

[262] Ibid., para. 23.

[263] Ibid., para. 35.

[264] Report of the fourth meeting of the Ad Hoc Steering Group for the "assessment of assessments" of the regular process for global reporting and assessment of the state of the marine environment, including socio-economic aspects, UNEP and IOC document GRAME/AHSG/4/2.

[265] See, for example, A/62/66/Add.2, para. 244.

jurisdiction, partnerships among and between States and organizations can promote capacity-building and synergies not only in the pooling of resources, financial and otherwise, but also in the identification of priorities and training strategies.

209. Dissemination of knowledge and information can also be a catalyst for the development of the capabilities of developing States. Access to relevant information and technology can be attained through different means, including exchange of data, partnerships in research and development and in commercial joint ventures, human resource development and access to research facilities and laboratories. Access to raw data and information could also be seen as one of the methods of technology transfer (see paras. 15-42 above).

210. To assist with technology transfer and cooperation, the General Assembly has encouraged States to use the IOC Criteria and Guidelines on the Transfer of Marine Technology which offer guidance to States on the implementation of Part XIV of the Convention.[266] The questionnaires on State practice regarding the transfer of marine technology[267] provide information on centres of expertise for marine science and technology that could facilitate international collaboration and exchanges of expertise.[268]

211. It is important to secure adequate funding for required capacity-building in relation to research, implementation and enforcement for the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction. In this connection, donor agencies may wish to consider how they could most effectively respond to the call of the General Assembly (see para. 204 above).

D. Cooperation and coordination in implementation

212. A number of activities to enhance international cooperation and coordination, and thereby improve governance in relation to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction, have been outlined in this and previous reports of the Secretary-General. At the 2008 meeting of the Working Group, divergent views were expressed on whether there was a regulatory or governance gap and, if so, how it should be addressed.[269]

213. Delegations generally recognized, however, that there were implementation gaps in the international legal framework, and emphasized the need for full and effective implementation of existing instruments, including available principles and tools, for the strengthening of existing institutions and arrangements and for enhanced cooperation and coordination (also see paras. 153-171 above).[270] Specific issues raised in this context included improved flag State control, developing port State control and market measures, performance reviews of regional fisheries management organizations, increased coverage of regional arrangements in terms of geographical scope and species, as necessary, and the need to implement General Assembly

[266] Resolution 63/111, para. 18. See also IOC Criteria and Guidelines on the Transfer of Marine Technology, IOC document IOC/INF-1203.

[267] General Assembly resolution 56/12, para. 23, and IOC Executive Council resolution EC-XXXV-7.

[268] Report by the Coordinator of the Practices of Member States on Marine Scientific Research and Transfer of Marine Technology, IOC document IOC/ABE-LOS VIII/8.

[269] A/63/79, para. 42. The need for improved governance was highlighted by the World Conference on Marine Biodiversity. See the Valencia Declaration at note 251 above.

[270] A/63/79, paras. 40-48.

resolution 61/105 with respect to the impacts of bottom fishing on vulnerable marine ecosystems (also see para. 56). The importance of capacity-building and technology transfer was emphasized by several delegations (see paras. 172-182).

214. Examples of ongoing sectoral and cross-sectoral cooperation to facilitate and strengthen implementation of relevant instruments are outlined in section II of the present report. Where necessary, it would be important to further increase the focus of implementation efforts on measures aimed specifically at the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction.

215. FFA suggested that experiences relating to the governance of highly migratory species and other fisheries from the Pacific islands region could be drawn upon to inform discussion on approaches to promote international cooperation and coordination in the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction. It also suggested that an evaluation of the outcomes of actions in the short term could determine whether an implementing agreement under the United Nations Convention on the Law of the Sea would need to be developed in the medium- to long-term.[271]

216. Critical to the effective implementation and enforcement of the Convention and relevant instruments aimed at the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction is the effective control by flag States over ships flying their flag (see para. 54 above); port State control (see paras. 54, 55, 168, 180 and 213); effective monitoring, control and surveillance;[272] and capacity-building (see paras. 172-182). The General Assembly consistently calls upon flag States to take the necessary action to strengthen flag State implementation and enforcement.[273] IMO and FAO have undertaken a number of initiatives to strengthen flag State implementation, which should continue to be supported (see paras. 54, 66-77 and 182).[274] Similarly, in view of the important complementary role that port States have in the enforcement of relevant conventions,[275] it is important to continue to support efforts aimed at strengthening port State control, in particular in the context of fisheries (see paras. 54 and 55).

217. Notably, FFA recommended strengthened and effective implementation of flag State, port State and coastal State responsibilities within existing regional fisheries management organizations and arrangements.[276] It also reported that it would encourage its members to consider widening the scope of requirements imposed on flagged vessels engaged in activities on the high seas to include adherence to General Assembly resolution 61/105 and objectives relating to the conservation and sustainable use of marine biodiversity on the high seas. It also noted that appropriate terms and conditions on foreign vessels for access to national waters was an option (e.g. a prohibition on high seas fishing as a condition for fishing access to national waters), or alternatively, terms and conditions for entry and access to ports, particularly for categories of vessels that would not necessarily fish in national waters.

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[271] Contribution of FFA.

[272] See A/62/260, paras. 106-115 and 119-125; A/62/66/Add.2, paras. 303-307; and A/63/128, paras. 89-91 and 95-96.

[273] See resolutions 63/111 and 63/112.

[274] See A/64/66/Add.1. See also A/62/66/Add.2, paras. 303-307 and 319-323.

[275] See General Assembly resolutions 63/111 and 63/112.

[276] Contribution of FFA.

E. Cooperation and coordination for integrated ocean management and ecosystem approaches

218. It is generally recognized that cooperation and coordination are at the basis of integrated approaches and ecosystem approaches, while the fragmentation of management regimes on the basis of species, issues or regions has presented a major obstacle to the implementation of an ecosystem approach beyond areas of national jurisdiction.[277] Benefit could thus be derived from greater cooperation between and among sectors, including through enhanced cooperation between the various organizations and bodies, both at the regional (regional environmental organizations, regional fisheries management organizations, large marine ecosystems) and global levels (FAO, ISA, IMO, Convention on Biological Diversity).[278]

219. The implementation of integrated approaches to management and ecosystem approaches beyond areas of national jurisdiction presents particular challenges in view of the ecological as well as jurisdictional characteristics of these areas. In that regard, the agreed consensual elements relating to ecosystem approaches and oceans resulting from the seventh meeting of the Consultative Process, subsequently endorsed by the General Assembly,[279] could be further considered with a focus on their application to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction.

220. The transition towards an ecosystem approach would also require action to ensure that the components of an ecosystem, the phenomena and activities that affect it and the legislative and policy frameworks are coordinated in a systematic manner to address interactions and cumulative effects. While the stakeholders, tools and management frameworks to begin this process have been identified, an appropriate modus operandi still has to be identified and taken forward to coordinate this over-arching approach.[280]

221. In relation to the fisheries sector, NEAFC pointed out the need to further cooperate to find a balance between conservation and utilization of fisheries resources through a holistic, integrated process, applying the precautionary and ecosystem approaches and securing the participation of relevant stakeholders.

222. At the regional level, in the case of large marine ecosystems[281] that include areas beyond national jurisdiction, management approaches would need to be in accordance with the jurisdictional framework of the Convention and its implementing Agreements. This highlights the need for consideration at the global level of management approaches, with the involvement of all relevant stakeholders.

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[277] UNEP, note 56 above.

[278] Executive summary of the workshop on governance of marine areas beyond national jurisdiction: management issues and policy options, 3-5 November 2008, Singapore, available at www.globaloceans.org/highseas/index.html.

[279] Resolution 61/222, para. 119.

[280] See note 3 above. Also see Valencia Declaration (note 251), which urged that integrated ocean management be put in place covering human activities impacting on marine biodiversity and ecosystems both within and beyond national jurisdiction, and that participative management structures be developed where they do not exist, engaging those involved in the exploitation of marine living resources with the goal of sustainable use of marine biodiversity.

[281] See A/62/66/Add.1, para. 168 and A/62/66/Add.2, para. 160.

F. Cooperation and coordination for environmental impact assessments

223. Some delegations at the 2008 meeting of the Working Group suggested that since sectoral and regional approaches did not provide for the assessment of cumulative impacts of activities, the development of global guidelines on environmental impact assessments could be further considered.[282] In that regard, on the basis of the work undertaken under the Convention on Biological Diversity (see para. 133 above), the opportunities, challenges and difficulties in carrying out environmental impact assessments beyond areas of national jurisdiction could be further discussed, including issues relating to capacity-building for developing States.

224. The approaches provided in relevant instruments highlighted above (see paras. 130 and 131), including General Assembly resolution 61/105 for bottom fishing activities and the FAO Guidelines (see para. 132), could be applied to activities which are currently not subject to any environmental impact assessment requirement. Cooperation among relevant international organizations with a view to exchanging information and best practices and facilitating an integrated approach would be essential.

G. Cooperation and coordination in relation to area-based management tools

225. At the 2008 meeting of the Working Group, some delegations stated that progress needed to be made within existing regional and sectoral bodies towards the identification and designation of areas in need of protection, including in the context of IMO, ISA, regional fisheries management organizations and arrangements and regional seas conventions and environmental bodies. Others noted that a more comprehensive and integrated approach to the establishment and management of area-based management tools was needed. Some emphasized the need for a multilateral mechanism to identify areas in need of protection beyond areas of national jurisdiction, and for a coordinated approach in the establishment of a network of marine protected areas in those areas.[283]

226. A number of area-based management tools are available,[284] and States could further cooperate in the context of relevant organizations to implement such tools beyond areas of national jurisdiction. In that regard, the General Assembly has reaffirmed the need for States to continue and intensify their efforts, directly and through competent international organizations, to develop and facilitate the use of

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[282] A/63/79, para. 18. The IUCN World Conservation Congress, in its resolution 4.031, urged the General Assembly to adopt a resolution calling on States to: (a) develop assessment processes, including the assessment of cumulative impacts, of human activities with a potential for significant adverse impacts on the marine environment, living marine resources and biodiversity in areas beyond national jurisdiction; and (b) ensure that assessed activities with the potential for such significant adverse impacts are subject to prior authorization by States responsible for nationals and vessels engaged in those activities, consistent with international law, and that such activities are managed to prevent such significant adverse impacts, or not authorized to proceed.

[283] A/63/79, paras. 28 and 30. See also resolutions 4.031 and 4.045 of the IUCN World Conservation Congress.

[284] See A/62/66/Add.2, paras. 122-161.

diverse approaches and tools for conserving and managing vulnerable marine ecosystems, including the possible establishment of marine protected areas, consistent with international law, as reflected in the United Nations Convention on the Law of the Sea, and based on the best scientific information available, and the development of representative networks of any such areas by 2012.[285]

227. UNEP is of the view that significant gaps exist in the legal and governance framework for the implementation of a network of high seas marine protected areas. It has encouraged States to conclude international agreements on the implementation of the Convention to protect biodiversity on the high seas on the basis of ecosystem-based management and the precautionary approach. UNEP suggested that specific and clear practical guidance on management aspects was needed in particular as regards the implementation of marine protected areas beyond areas of national jurisdiction. It stated that such guidance could be developed on the basis of lessons learned through the designation of pilot sites as well as experience gained in managing marine protected areas in remote, offshore areas.[286]

228. The work under way under the Convention on Biological Diversity to provide scientific and technical guidance on the use and further development of biogeographic classification systems and on the identification of areas beyond national jurisdiction which meet the Convention's scientific criteria presents an opportunity for cooperation and coordination among and between States and relevant organizations on scientific and technical aspects. The outcome of these efforts will provide a valuable contribution to further discussions by the General Assembly, as also recognized at the 2008 meeting of the Working Group.[287]

229. In that respect, the proposal made at the 2008 meeting of the Working Group to establish a liaison group comprised of relevant organizations, including the secretariat of CBD, FAO and IMO, and facilitated by the United Nations, to develop a joint approach and guidance on the application of criteria for the identification of ecologically or biologically significant marine areas in need of protection beyond areas of national jurisdiction, in accordance with international law, could be further explored. The liaison group could, on the basis of the work done under the Convention on Biological Diversity (see paras. 137-139 above) and under the guidance of the General Assembly, further analyse issues related to, inter alia, the designation of applicable measures, the development of management objectives and monitoring and enforcement.[288]

230. IHO noted that it could consider inserting in the nautical charts and publications produced by its member States' hydrographic offices, ecologically or biologically significant marine areas in need of protection beyond areas of national jurisdiction and the established rules for protection. In that way, seafarers and others would be advised on the limits and rules prevailing in those sensitive areas.[289]

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[285] Resolution 63/111, para. 134. See also para. 32 (c) of the Johannesburg Plan of Implementation adopted at the World Summit on Sustainable Development.

[286] Contribution of UNEP.

[287] A/63/79, para. 29. See the Valencia Declaration (note 251 above), which calls for a mechanism for improved cooperation with regard to identifying and protecting ecologically and biologically significant areas based on the scientific criteria adopted under the Convention on Biological Diversity for the open ocean and deep seas.

[288] A/63/79, para. 29.

[289] Contribution of IHO.

H. Cooperation and coordination in relation to marine genetic resources

231. Divergent views continue to be held with regard to the relevant legal regime for activities related to marine genetic resources beyond areas of national jurisdiction.[290] At the 2008 meeting of the Working Group, several States, while open to considering practical measures (see para. 112 above), underlined the importance of also continuing the discussions on the legal regime. Several delegations expressed support for the continuation of discussions on marine genetic resources beyond areas of national jurisdiction under the aegis of the General Assembly and within the framework of the United Nations Convention on the Law of the Sea, while also taking into account relevant work in other forums.[291]

232. The General Assembly, in its resolution 63/111, noted the discussion on the relevant legal regime on marine genetic resources beyond areas of national jurisdiction in accordance with the Convention, and called upon States to further consider this issue in the context of the mandate of the Working Group, with a view to making further progress on this issue.[292]

233. Consideration may be given as to whether, and if so how, an informal dialogue among States could facilitate discussions on marine genetic resources in the context of the Working Group.[293] Greater involvement of the scientific community, industry and the private sector in policy discussions could also be beneficial to ensure policy-relevant input from the main actors.

234. With regard to possible practical measures, genetic diversity being the underpinning of biodiversity, the measures outlined throughout this and previous reports regarding the conservation and sustainable use of marine biodiversity are generally applicable and necessary to maintain genetic diversity and prevent genetic erosion,[294] thereby continuing to provide a potentially valuable genetic resource pool. Those measures include monitoring and assessments, the precautionary and ecosystem approaches, the conduct of environmental impact assessments and area-based management tools.

235. An analysis of experiences and lessons learned within areas of national jurisdiction, in respect of both terrestrial and marine genetic resources, may provide insight into the feasibility of specific measures for marine genetic resources beyond areas of national jurisdiction. In that regard, a particular proposal was made at the 2008 meeting of the Working Group to use the system under the International Treaty on Plant Genetic Resources for Food and Agriculture, which applies to resources

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[290] A/63/79, paras. 36 and 37.

[291] Ibid., paras. 38 and 39.

[292] Resolution 63/111, para. 122.

[293] A number of possible approaches to facilitate discussions on marine genetic resources beyond areas of national jurisdiction have been put forward. See, for example, IUCN, "Options for addressing regulatory and governance gaps in the international regime for the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction", 2008. See also "Submission of the Global Forum on Oceans, Coasts, and Islands to the United Nations Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction", 2008.

[294] See A/62/66, para. 159.

found within national jurisdiction, as a reference point for discussions (see paras. 112-114 above).

IV. Key issues and questions whose consideration by States would benefit from more detailed background studies

236. Notwithstanding past and present efforts and initiatives to increase knowledge of marine biodiversity beyond areas of national jurisdiction, significant knowledge gaps still exist. The present section highlights a summary of the required studies identified by the Working Group at its 2006 and 2008 meetings (see A/61/65, annex II and A/63/79), and identifies areas where further studies are necessary. A list of documents and studies cited by relevant organizations is annexed to the present report.

A. Studies previously identified by the Working Group

237. At the 2006 meeting of the Working Group, further research was considered necessary with respect to the following issues: biological diversity and environment conditions of the bathypelagic zone, the trenches and the seamounts; and mapping of cold-water coral ecosystems associated with seamounts; long-term time-series studies of marine biological diversity beyond areas of national jurisdiction to evaluate natural variability and understand the resilience of deep-sea ecosystems to the impacts of anthropogenic stresses; policy-relevant scientific assessment of existing available information to inform decision-making; level of dissemination of the results of scientific research; and knowledge gaps not included in the list above, including distribution of all marine species on the Red List of threatened species of IUCN; information on the distribution of seamounts and cold-water coral reefs, their ecosystem functioning and the ecology of associated species, from a range of different depths, in particular from poorly sampled areas; information on the distribution of other habitats (for list, see UNEP/CBD/WG-PA/1/2, annex I, table 1) and the ecology of associated species; and studies of the ecology of marine species and their behaviours that determines their vulnerability to human activities.[295]

238. With respect to climate change, further studies were called for in relation to the impacts of climate change on marine biological diversity in the high seas and the deep seabed (A/61/65, annex II, para. (c)); and scientific understanding of the role of oceans in regulating climate and of the impacts on the marine environment of both climate change and the technologies used for climate mitigation purposes should be improved (A/63/79, para. 14). The urgent need to promote additional research and information sharing on new and emerging activities (e.g. geo-engineering activities aimed at climate mitigation strategies) was highlighted (A/63/79, para. 15), as well as the need to undertake studies to address gaps in science and technological capacity in developing countries, including through the use of questionnaires (A/61/65, annex II, para. (v)).

239. In relation to marine genetic resources, at the 2006 and 2008 meetings of the Working Group, delegations identified a number of specific areas requiring further studies. These related to the relationship between marine genetic resources and other

[295] A/61/65, annex II, paras. (e), (u) and (w).

resources (A/63/79, para. 34); the nature and level of interests and activities in respect of marine genetic resources beyond areas of national jurisdiction, in particular commercial interest in genetic resources from the deep sea, including costs and risks involved (A/61/65, annex II, para. (l) and A/63/79, para. 34); the marine biotechnology development process and the benefits arising from the commercialization of marine genetic resources (A/63/79, para. 34); the economic aspects of the exploitation of deep seabed genetic resources (A/61/65, annex II, para. (i)); the mapping of species and areas of potential interest for biotechnological activities, with a view to identifying appropriate measures for conservation and sustainable use (A/63/79, para. 34); the existing legal framework to identify principles relevant to the genetic resources of the Area (A/61/65, annex II, para. (o)); practical measures to enhance the conservation and sustainable use of marine genetic resources and possible options for benefit-sharing, which include non-monetary benefits, such as the need for international cooperation in marine scientific research through the exchange, sharing and dissemination of information on research programmes, objectives and results, as well as cooperation in the transfer of technology (A/61/65, annex II, para. (p) and A/63/79, para. 38); the legal arrangements and modalities of operation of existing partnerships of scientific research institutions with the marine biotechnology industry, both public and private and ways to broaden participation in such partnerships so as to involve developing countries (A/61/65, annex II, para. (q)); the regimes or applicability of intellectual property rights, including the relationship between the legal framework of intellectual property rights and the United Nations Convention on the Law of the Sea (A/61/65, annex II, paras. (r) and (t) and A/63/79, para. 37); and trends in the implementation of international obligations regarding intellectual property rights, in particular the manner in which patent requirements are being implemented in national legislation (A/61/65, annex II, para. (s)).

240. In relation to management, the need for further studies on available management tools for the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction, including multiple use marine protected areas was identified. Issues relating to the establishment, management and enforcement of potential MPAs beyond national jurisdiction were also identified as an area for further study. Further studies were called for with respect to environmental impacts of anthropogenic activities, including illegal, unreported and unregulated fishing, bottom trawling, shipping, noise pollution and marine scientific research, as well as actions taken to address these impacts by various actors, including States and researchers.[296]

241. With respect to governance, in particular the effective implementation and enforcement of existing instruments, the Working Group identified the need for a study on the reasons for which some legal instruments were not widely ratified and/or implemented (A/61/65, annex II, para. (n)).

242. In relation to economic and socio-economic fields, areas for further study identified by the Working Group included economic aspects of various activities, including illegal, unreported and unregulated fishing and exploitation of deep seabed genetic resources; economic assessment techniques for both restoration and non-use values; economic incentives, including market-based incentives, and disincentives for the conservation and sustainable use of marine biological diversity

[296] Ibid., paras. (g), (h) and (b).

beyond areas of national jurisdiction; and the socio-economic value of marine biological diversity beyond areas of national jurisdiction.[297]

243. Several studies have recently been undertaken which address various aspects of the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction. Information on the areas identified for further study and studies related thereto has been provided in previous reports of the Secretary-General.[298] In addition, a number of related scientific and policy articles have been or will be published in relevant journals. The annex to the present report provides a list of documents and studies cited by relevant organizations in their contributions to the report. Throughout the report, reference is made to other studies and documents which, though not included in the annex, should also be noted.

244. Additionally, UNEP indicated that it had recruited a team of international experts to prepare a report on deep-water sponge fields, one of the vulnerable marine ecosystems and areas of biodiversity beyond national jurisdiction.

245. The UNEP Coral Reef Unit collaborated with the International Cable Protection Committee in the preparation of a joint report on submarine cables and the marine environment, to be published in 2009. It will include information on the operation of this industry in deep waters both within and beyond areas of national jurisdiction. The Unit is also preparing a report on marine bacteria and viruses and the importance of these organisms for global marine processes and cycles.

246. The Unit will work with other partners in the Hermione project (see paras. 20, 21 and 190 above) on a number of project deliverables for the European Community, including a preliminary protocol for quantification and/or qualification of human impacts on deep sea ecosystems, a report on ecosystem goods and services of deep sea environments and a report on existing governance regimes, principles and policy instruments for the deep sea.

B. Areas where further studies are necessary

247. While the studies undertaken so far represent a major step forward in expanding the level of knowledge and understanding of marine biodiversity beyond areas of national jurisdiction, and hence could facilitate and support current policy discussions, further research is nevertheless needed to continue providing updated information. In addition to the studies already identified by the Working Group, as outlined above, many of which remain to be undertaken, a number of areas where further studies are necessary have been identified in contributions to the present report. Reference is also made, where appropriate, to ideas for further studies presented in recent publications. The Working Group may wish to consider inviting UN-Oceans, through its Task Force on Biodiversity Beyond Areas of National Jurisdiction, to assist in identifying ways and means of carrying out the necessary studies.

248. With respect to marine science, UNEP pointed out that the main gaps in biodiversity knowledge relate to geographic location; biotic distribution; depth and associated biodiversity; complete representation; less charismatic species such as

[297] Ibid., paras. (i), (j), (k) and (m).

[298] See, in particular, A/60/63/Add.1, A/62/66, section X and A/62/66/Add.2.

invertebrates; and complex physical and ecological processes (see also paras. 140 and 258 above).

249. FFA emphasized, in its contribution, that a greater scientific understanding of fish stocks and other marine living resources beyond areas of national jurisdiction was needed.

250. It has been noted that more research was needed to qualify and quantify cumulative impacts of main human activities on key marine habitats and ecosystems beyond areas of national jurisdiction, as well as other impacts (such as those induced by climate change) causing extra stress on the systems. Key research needs on human activities beyond areas of national jurisdiction include mapping of activities, impacts, stakeholders, and potential conflicts between activities as well as the development of plausible scenarios of future trends in economic activities. Studies are also needed on how various direct and indirect impacts may interact and combine. This, together with studies of effects of these impacts on the provision of ecosystem goods and services from those ecosystems, including their socio-economic valuation, would allow a better assessment of threats and to prioritize areas for policy action, depending on ecosystem vulnerability and fragility, the extent of activities, and their associated impacts.[299]

251. The General Assembly has encouraged further studies and consideration of the impacts of ocean noise on marine living resources.[300] The Convention on the Conservation of Migratory Species of Wild Animals, in its contribution, suggested that a thorough impact assessment and further research be undertaken, as well as wide sharing of information between the international community, academia and industry, in order to find solutions to adverse effects of noise pollution on whales and other marine species.[301]

252. There have been calls for further studies regarding ocean fertilization, in particular by the General Assembly and in the context of the Convention on Biological Diversity and the London Convention and Protocol (see paras. 87-89 above).

253. Further research is needed to provide reliable and updated information to support policy discussions related to marine genetic resources.

254. FFA noted the need for a legal study on marine genetic resources beyond areas of national jurisdiction to determine, particularly, whether these resources are part of the common heritage of mankind in the Area or whether they form part of the regime of the high seas. If marine genetic resources were deemed not to be part of the common heritage of mankind, the FFA secretariat would wish further discussion on whether marine biodiversity and genetic resources found within high seas enclaves surrounded entirely by the exclusive economic zones of small island developing States should be accorded a special status.[302]

255. Research is also needed on ways to implement an ecosystem approach and on holistic, integrated, intersectoral and adaptive management, in practice, including empirical testing of options and benchmarking for best practices. This should

[299] UNEP, note 56 above.

[300] Resolution 63/111, para. 141.

[301] Contribution by the secretariat of the Convention.

[302] Contribution of FFA.

comprise mapping of stakeholders and proactive research on how to manage new and emerging issues or activities.[303]

256. Increased knowledge of the goods and services and other benefits provided by the deep sea and its ecosystems, and estimates of their values, would support management decisions. In light of the difficulty of assigning monetary value to ecosystem goods and services beyond areas of national jurisdiction, more research could be undertaken on alternative methods for taking their value into account in decision-making processes. More research is also needed on both monetary and non-monetary valuation techniques and on how to use available valuation evidence in decision-making processes.[304]

257. It has been suggested that practical environmental impact assessment methodologies beyond areas of national jurisdiction need to be developed as well as operational socio-economic and ecological indicators, which can be used for ecosystem management. The latter could be linked to research into spatial planning and GISs, including socio-economic data for management support. Economic studies of subsidies and other economic incentives/disincentives as well as of different market-based instruments are also needed.[305]

258. With respect to area-based management, UNU-IAS suggested that it would be useful to review the experiences of existing and planned pilot marine protected areas (e.g. in the context of the north-east Atlantic, the Mediterranean and the Agulhas and Somali current large marine ecosystem), as well as the adequacy of the existing legal regime to support area-based and other management actions. UNEP suggested that there was a need to develop guidance on the use of proxies to assist with the identification of potential areas of ecological and biological significance, and to identify areas representative of a particular habitat or community type in a specific bioregion, in order to support the development of representative networks of marine protected areas.

259. Further studies on capacity needs in relation to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction should be undertaken. For example, FFA proposed a study on ways in which the special requirements of developing States in the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction could be fully recognized. Such a study would be informed by existing mechanisms and challenges faced with their implementation. This study could also include an analysis of the extent of participation in high seas fisheries of developing States, particularly SIDS, and whether the framework can extend to bioprospecting and marine scientific research activities beyond areas of national jurisdiction.[306]

V. Conclusions

260. This report underlines the importance of marine biodiversity beyond areas of national jurisdiction for healthy functioning marine ecosystems, economic prosperity, global food security and sustainable livelihoods, but also draws attention

[303] UNEP, note 56 above.
[304] Ibid.
[305] Ibid.
[306] Contribution of FFA.

to numerous factors which continue to put essential marine ecosystems at risk. These include limited, albeit expanding, knowledge of the richness and resilience of biodiversity in some areas of the oceans; absence of regular monitoring programmes; limited capacity to implement and enforce relevant instruments; divergent views regarding the conservation and sustainable use of marine genetic resources beyond areas of national jurisdiction; difficulties in implementing integrated ocean management, ecosystem approaches and other management tools, owing, in particular, to limited cross-sectoral cooperation at all levels; and the lack of global policy guidance on some issues.

261. While several encouraging efforts and activities have been initiated and sustained since the 2006 and 2008 meetings of the Working Group, as outlined in the present report, it is vital to continue and strengthen efforts aimed at the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction. The General Assembly, through its Working Group, is uniquely placed to review the progress that has been made so far from a cross-sectoral and multidisciplinary perspective and identify what additional actions need to be taken at various levels. In this regard, a number of options and approaches have been included in the report for the consideration of the Working Group.

262. Recent developments indicate that the absence of global policy guidance on some issues may result in some coastal States developing measures at the regional level, for example, as regards the establishment of marine protected areas. Therefore, timely policy guidance by the General Assembly to facilitate the consistent and uniform application of the United Nations Convention on the Law of the Sea and other relevant instruments with respect to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction is highly advisable.

Annex

List of documents cited by organizations in their contributions to the present report

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